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THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—9TH YEAR. SYDNEY: SATURDAY, MAY 27, 1922. No. 21.

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THE TREATMENT OF MALIGNANT DISEASE BY RADIATION.[1]

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Introductory.

FIRST of all I want to state quite frankly that there is nothing very original or startling in this discourse. Having an illustrative case to show you, I thought it opportune to read a short paper on the subject, hoping thereby to give you a succinct account of a branch of medicine which I am sure many of you have little time to study.

The majority of medical men have, I know, a very meagre knowledge of the subject of radio-therapeutics—this for many reasons. In the first place, the subject is highly technical theoretically and practically and yet this knowledge is absolutely necessary for rational treatment; and, secondly, it is not usually included in the medical curriculum, so that little is learned by the student and subsequent knowledge is only gained by the practitioner, if specially interested, by the perusal of isolated articles in the medical journals.

Realizing all this and being myself impressed with the importance of the subject in its relation to present-day treatment of disease in general and malignant disease in particular, I have ventured to address you this evening on the radiation treatment of malignant disease.

In opening a discussion on the subject, I think it very essential to start at the beginning and therefore I propose to deal with it from the point of view of the medical man "in the street" by attempting to answer the following questions:

(1) What is radiation?
(2) What effect has it on tissues, normal and pathological?
(3) What is to be expected of it in the treatment of malignant disease and how and when should it be employed?

What is Radiation?

In short, as I use the term to-night, radiation is a form of energy derived from a radio-active element such as radium or from a suitably energized X-ray tube. It differs from light only in having a very much shorter wave-length, by virtue of which it has the power of penetrating matter opaque to light rays. In passing through material such as the body tissues the radiation is gradually absorbed and it is this absorbed radiation which, it is generally conceded, has therapeutic action.

Here let me impress upon you the fact that radium

[1] Read at a meeting of the South Australian Branch of the British Medical Association on February 23, 1922.

rays and X-rays as used therapeutically in malignant disease are almost identical and interchangeable. As you know (or have forgotten) radium, in disintegrating, emits three kinds of so-called rays—the α particles of atomic size, which can be stopped by a piece of paper, the β particles, very much smaller and more penetrating, but which are largely screened off in practice, and the γ rays, which represent the same form of energy as X-rays, but which at present have a somewhat greater average penetrability. Where they differ is in their mode of application; whereas X-rays can be produced in greater abundance and more cheaply, radium rays can be concentrated locally in places relatively inaccessible to X-rays. Their physiological effects are identical.

What is the Action of Radiation on Tissues, Normal and Pathological?

Without going deeply into the physics of the question, it is enough to state, as mentioned already, that radiation is absorbed by the tissues. The amount absorbed depends on many things, for example, the relative density of the tissues, the depth from the surface, the quality and quantity of the radiation and so forth. In having its energy transformed in this way, radiation can have profound and far-reaching physiological effects on the tissues.

As a general rule and one which applies to all tissues, normal or morbid, small amounts of radiation stimulate cell activity, while larger doses depress and ultimately cause destruction of the tissues. A recognition of this somewhat paradoxical action is obviously of vast importance in the radiation treatment of malignant disease, as with lack of adequate technical knowledge and experience a growth may actually be encouraged in the attempt to eradicate it.

Supposing that a destructive dose of radiation has been administered, let us see what the reaction of the tissues irradiated will be. The first changes noticeable microscopically will be a cloudy swelling of the fixed tissue cells, soon followed by cytoplasmic degeneration and breaking up of the nuclei; leucocytic invasion and much small round-celled infiltration soon occurs; the central zone goes on to actual necrosis and sloughing; in a zone surrounding this the damaged cells are removed by the phagocytes, the inflammatory reaction subsides and fibrous tissue formation begins to replace the destroyed tissue. Outside this again is an area of increased tissue activity. In the radio-therapeutics of malignant disease it is the aim of the operator to include all the malignant tissue in the first two zones; if this objective be attained, those malignant cells not actually destroyed in the first place are walled off into nests by the fibrous tissue formation, many of them succumbing to a process of strangulation; but, unfortunately, some may persist, to spring into activity at a future date. You will recognize some of these changes as having occurred in the case I showed you earlier in the evening and you saw the end result—the replacement of cancerous tissue by scar tissue.

All tissues do not respond equally to the action of radiation. Some are very susceptible to the destructive action; usually the more cellular the tissue, the more susceptible it is, *e.g.*, lymphocytes and glandular tissue; while others, such as bone and nerve, are highly resistant.

Again, the more fixed and stable the type of cell, the more resistant is it; conversely, the more nearly a tissue approaches an undifferentiated or embryonic type, the easier it becomes to cause its destruction by radiation. Hence, as a general rule, pathological tissue is more radio-sensitive than normal tissue. It is this valuable property of radiation that makes it possible in many cases to destroy malignant tissue without causing irreparable damage to the normal tissue adjacent.

To continue, it is found that cells in state of active mitosis are more vulnerable than the same cells in the resting stage, so that, broadly speaking, a rapidly growing tumour is more easily influenced than a slowly growing one.

The blood supply is also a consideration. Very vascular tissue, especially when the blood vessels are mainly capillary in type, is more radio-susceptible than that with a poor or well-formed arterial blood supply.

It will thus be seen that a particular case must be viewed from many aspects when attempting to calculate the probable effect of radiation therapy. However, a consideration of these factors is essential in estimating what class of tumour is or is not likely to be benefited by radiation treatment. This, I take it, is what the general practitioner wants to know. Let me, therefore, emphasize by brief recapitulation. In general, a tumour would be considered very amenable to radio-therapy having the following characteristics: a preponderance of cellular tissue of relatively undifferentiated or embryonic form, without much stroma, rapidly growing and vascular; as these characters approach the normal, the radio-susceptibility decreases.

There is one other effect of radiation which, though not directly curative, is yet of immense importance in its relation to malignant disease, *viz.*, its analgesic effect. You are all too well acquainted with the intolerable pain of cancer, the most distressing symptom of this terrible disease, especially in its later stages. In most cases, this pain begins to disappear, sometimes quite vanishes, after the first few exposures to the rays and is replaced by a feeling of comparative comfort and well-being. If for no other reason than as a pain-killer, radiation treatment is indicated in malignant disease, as it seldom fails.

Equipped with a knowledge of the peculiar and specific powers of our therapeutic agent, we are in a position to consider its practical application.

How and When is Radiation Therapy Indicated in Malignant Disease and what Results may be Anticipated.

There are three main lines of treatment by radiation, depending on circumstances: the radio-susceptibility of the neoplasm, the stage of its progress, its location and operability, etc.. Thus, it may be employed alone as a curative agent or prophylactically in conjunction with surgery or as a palliative measure with or without surgery.

As a Curative Agent.

At the present time, in the majority of cases surgery comes first in the treatment of malignant disease. However, there are a few instances in which radiation holds out as good prospects of cure as surgery, for example, rodent ulcer. Again, most sarcomata, especially lympho-sarcomata, having most of the radio-sensitive characters already mentioned, are very amenable to radiation treatment. Often they occur in a position inaccessible to the knife, *e.g.*, in the mediastinum, and yet at least a temporary disappearance can usually be brought about under the influence of radiation, sometimes an apparent permanent cure. As good results can be obtained in treating a lympho-sarcoma in any locality by radiation as by surgical removal. The response of the round-celled variety is not so rapid or sure, but radiation is certainly indicated should any contra-indication to surgery exist; spindle-celled sarcoma, as a rule, is relatively disappointing, but not at all hopeless. There are other conditions in which the prospect of cure by radiation is moderately good. In this category may be included such forms of malignant disease as early epithelioma of the lip and skin, cauliflower epithelioma of the tongue, endothelioma when not too deep, *e.g.*, of the parotid, carcinoma of the cervix or body of the uterus (only, of course, with radium). In such cases, should operation be inadvisable for any reason, radiation is certainly called for.

Do not think for a moment that I am a medical Bolshevik, out for the annihilation of the surgeon. On the contrary, I want him to realize that in radiation, rationally employed, he has a potent ally.

As a Prophylactic Agent.

This brings us to the second method of treatment, *viz.*, prophylactic application of these rays.

You have seen practical proof this evening of the lethal effect of radiation on cancerous tissue: millions of cancer cells have been destroyed in that recurrence. Would it not have been better and easier to have killed the forefathers of those cells, when they were relatively few in number?

It is just with this end in view that prophylactic irradiation is used in conjunction with surgery, either before or after operation, preferably both. In this way better results are certain to be obtained than by the use of either surgery or radiation alone.

The method of procedure is as follows: A week or so prior to operation, an intensive dose of rays is administered to the growth and surrounding parts, to include all areas of lymphatic drainage or possible lymphatic permeation. This is done with the object of lowering the vitality of the cancer cells in the event of some being replanted in the tissues at the operation. As soon after operation as possible, post-operative irradiation is commenced. This extends over months and the dosage should be that amount which, it is calculated, would be necessary to cause the disappearance of the growth, had operative interference not been resorted to.

This combination of surgical and radiation treatment offers at the present time the best chances of cure of malignant disease. I unhesitatingly state that a surgeon who does not avail himself of the help of radiation, when it can be obtained, is not doing all that can be done for his patient.

It is immaterial whether X-rays or radium be used, provided that the necessary dosage be administered in the proper locality; in some cases this can only be accomplished with radium.

The above method of treatment applies to all varieties of operable malignant disease, with two exceptions, namely, infiltrating epithelioma of the tongue and epithelioma of the vulva. For some as yet unexplainable reason these tumours prove very intractable to irradiation; in fact, it often seems that the morbid growth is encouraged instead of checked. Therefore, in these cases the indication for treatment is early excision of both growth and radiation; by that I mean cut out the growth and cut out the radiation!

As a Palliative Agent.

The third use to which radiation can be put, is for the palliative treatment of inoperable, recurrent and metastatic malignant disease.

Certainly once metastasis of a neoplasm has occurred, all hope of permanent cure has gone and the best that we can hope for is a temporary healing and alleviation of symptoms; but even such a result, in many instances, means a lot.

Local recurrences are usually amenable to radiation treatment, often remaining healed for years, especially recurrent carcinomatous nodules in an operation scar.

Glandular recurrences of sarcoma and carcinoma, when superficial, can usually be indefinitely controlled; deeper glands, owing to their inaccessibility, are not so easily influenced; but with improvement in technique and apparatus there is a brighter outlook.

In treating inoperable growths, it is sometimes difficult to know what the result is going to be. This is notably the case with sarcoma, especially the melanotic variety. In this condition a startling success may be obtained and in an apparently similar case there may be a disappointing failure. However, working along the lines indicated, it is usually possible to get an idea of the probable response to irradiation in the majority of cases.

In some instances, under the influence of radiation, an inoperable neoplasm may be so reduced in size and the patient's condition so improved that operation can subsequently be contemplated. This result sometimes ensues, for instance, in carcinoma of the breast or cervix.

However, if no better result can be obtained in an inoperable growth, the radiologist can look forward to relief of pain and perhaps diminution of offensive exudations with some degree of certainty. It is well to bear in mind that malignant disease, though often inoperable, is rarely "unradiable," if I may use such a nasty term.

Another line of treatment which should receive consideration, is surgical removal of as much of the diseased tissue as possible, followed by intensive irradiation. Some workers claim improvement in results by this procedure. A suitable case would be one in which the primary growth is removable, but the glandular involvement has gone beyond the

reach of the knife. Again, if a large, sloughing mass be excised and the site irradiated, it is found that epithelium will grow over the wound thus treated, whereas it might not over the original ulcerating surface.

Conclusion.

In conclusion, I wish to say that it has been my endeavour not to over-state the case for radiation; at the same time, I feel that its value as a therapeutic agent in the treatment of malignant disease is not adequately recognized and that, therefore, it is necessary to put forth its claims. Let some noble-minded man or government give two hundred milligrammes of radium to the hospital and re-equip the X-ray department with modern apparatus and I am confident you will see these claims substantiated.

CRITERIA OF NORMALITY IN THE GROWTH OF CHILDREN.

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PART I.—THE GROWTH OF INFANTS.

IN seeking to estimate the degree of super- or sub-normality of physical development in any given child, we are confronted with the problem of ascertaining what is to be considered a normal standard of development for a child of its given age. At first glance the problem appears to be a relatively simple one, for "standard" curves of infantile growth in weight are furnished in many well-known works, such as, for example, Newman's "Infant Mortality,"[8] and tables showing average heights and weights at each year of age during the usual period of school attendance are numerous and frequently quoted in the text-books on pædiatrics. Nevertheless, even a slight examination of the facts reveals a number of difficulties and uncertainties which attend the use of such standards and their practical value in estimating individual departures from the normal is very questionable.

In the first place, all observers are agreed that the average weight or height curve varies with the sex of the child and also with its race. While no "standard" has even been constructed for an unmixed race of human beings, if, indeed, any such exists, still growth curves and tables have been constructed for the children of peoples obviously differing in racial constitution, as the British,[1] [13] American,[3] [11] French,[20] German,[4] [21] Belgian,[12] Italian,[9] Swedish,[7] Japanese[6] and Filipinos[2] and all of these "standard" curves differ very appreciably from one another. In each instance, however, the "standard" has been arrived at by averaging the observed dimensions of children representing all of the constituent racial stocks of the country, in England, for example, Mediterranean, Scandinavian, German, Celtic and Jewish. How shall we determine, therefore, the departure from the average which is a permissible allowance for the peculiarities of bodily proportion which have been handed down to the individual child from its forbears? It is not a simple matter of elaborating our technique, by segregating the children of the main racial stocks and re-determining our standards for each of them, because in every country in Europe and those countries which have been populated by Europeans, almost every individual has descended from a variety of races and the standards obtained in the various communities differ from one another chiefly because the proportions of the admixture vary from one locality to another.

Another important factor which, however, has not been so generally recognized, is the direct effect which the environment exerts upon the bodily dimensions of the races which inhabit it. Thus I have found that South Australian infants weigh from eight to ten ounces more at birth than infants born in Great Britain[14] and this superiority of bodily dimensions is maintained throughout the first year of extra-uterine growth.[15] This fact is remarkable because, according to an article on the "People of Australia," contributed by Mr. G. H. Knibbs to the Federal Handbook of Australia issued in 1914 by the British Association for the Advancement of Science: "The Australian people, with regard to racial constitution, are virtually British, as the following figures from the last census show, and it may be added that the descendants of other European races disclose but small differentiation from their fellow citizens of British origin. . . . The evolution of the Australian people, therefore, may be regarded as that of the British people under changed climatic, social and economic conditions."

The results observed cannot be due to any racial selection among the immigrants from the British Isles who have given rise to the population of Australia, because, in the first place, there is no evidence that such selection has occurred to any greater extent than it has, for example, in London, of which city the very great increase of population during the past century has been contributed by all parts of the British Isles; and, in the second place, there is no evidence of the existence of a race in the British Isles which is in any consistent degree superior in physical dimensions to the average inhabitant of England.[1] It can only be inferred, therefore, that the superior weight of the Australian infant at birth is attributable to the factors enumerated by Mr. Knibbs, namely, the change in the climatic, social and economic environment.

Finally, even in a pure race, as in mice or rats which have been deliberately inbred to fix as far as possible the characteristics of the stock, the individual variations of bodily dimensions remain of very considerable magnitude and we may legitimately assume that, even in an unmixed race of human beings we would still encounter notable individual deviations from the average norm.

Given, therefore, a child who departs considerably from the weight or height commonly attained by children of like age, to what factor shall we attribute this deviation? To his racial inheritance, to the natural adaptation of a normal child to unusual but not necessarily adverse environmental

influences, to the inherent variability of all biological types or, on the other hand, to the effects of a faulty dietary, a functional abnormality or a disease process?

Obviously the answer to this question depends upon the standard employed and the degree of departure from that standard which it is permissible to regard as lying within the limits of normal variation.

The intimate dependence of the growth of normal infants upon environment, race and sex at once reveals the fact that there is no single standard of infantile development which will be applicable even to the average infant of either sex of differing racial stock or under varying environmental conditions. Thus a growth standard, even if it be regarded as applicable only to the average normal and not individual normals, who may differ widely from the average, must be constructed with regard to the sex, race and environment of the infants under consideration and it is evident that a French or German standard weight or height curve can give us very little reliable information concerning the super- or sub-normality of the British infant in comparison with the average, while an English standard is of equally little value when applied to infants in Australia.

In practice, however, we really need something more serviceable than an average standard growth curve, even though it be adapted to the sex, race and environment of the individual infant. As a matter of fact, it will be admitted by all who are engaged in practical work with infants, that comparison of the growth curve of an individual infant with a standard average curve yields little information of immediate practical utility that we would not derive from an examination of the individual curve without comparison with the standard. This is because we recognize that the inherent variability of the bodily dimensions of infants is so great that perfectly normal children of like sex and race and growing under nearly identical environmental conditions may differ widely and in opposite directions from the average normal standard. We clearly recognize in practice that the general "build" of healthy infants varies, even more than the general "build" and weight of healthy adults.

The criterion of normality upon which we rely in practice, is in reality the form of the individual growth curve rather than its deviation from any arbitrary standard. Provided the weight of the infant at birth was not excessively super- or sub-normal, we are satisfied if its curve of growth presents an even sweep of increments and is on the whole evenly parallel with the normal standard.

There is, however, a tendency to be satisfied with a super-normality of weight which may be of negligible importance when compared with the standard average, but which, compared with the growth level or "build" of the infant itself, may be just as ominous of impending disaster as a proportionate sub-normality of an infant whose personal "build" is above the average.

The growth curve of apparently perfectly normal children, however, rarely takes place in one even sweep. The curve of any individual child will usually show more or less marked irregular fluctuations, due to climatic variations, temporary hyper- or hypo-activity of the muscular or endocrine systems or minor ailments of insignificant intrinsic importance. In the average derived from a sufficiently large number of infants these fluctuations disappear, because in the long run just as many of them are positive (*i.e.*, super-normal) as negative (*i.e.*, sub-normal). The resultant curve offers a smooth sweep of steadily increasing dimensions which admits of extremely precise formulation,[15] [17] but no individual infant can be found to exemplify it. When the individual fluctuations are extensive, they are clearly enough indicative of faulty physiological conditions, but, on the other hand, if we were to regard all such individual fluctuations as abnormalities, there would be hardly any infant who could be regarded as "normal." Evidently, then, the problem of normality is quantitative rather than qualitative, so that what we need for practical guidance in individual cases is some measure of the limit of deviation from parallelism with the standard curve which may safely be regarded as normal. Such a measure of permissible individual deviation can be obtained by a study of the variability of the weights of normal infants.

In any fortuitously selected group of animals or human beings the individuals comprising the group will be found to vary in greater or lesser degree from the type or average which the group collectively represents. When a large proportion of the individuals comprising the group differ from the average to a considerable degree, the group or type is said to be highly variable, while, on the other hand, when but few of the individuals comprising the group depart widely from the average, the group or type is considered to be but slightly variable.

The measure of variability which is commonly employed by statisticians is the percentage ratio of the "standard deviation" of the quantities measured to their average value.[5] [22] The "standard deviation" is the square root of the mean square of the deviations of the individual measurements from the average. For example, if five measurements should yield the values 3, 4, 5, 6 and 7, the average value would be 5, the "standard deviation" would be

$$\sqrt{\frac{2^2 + 1^2 + 1^2 + 2^2}{5}} = 1.414$$

and the variability would be $\frac{1.414}{5} \times 100 = 28\%$.

If, again, five other measurements should yield the values 13, 14, 15, 16 and 17, the "standard deviation" would be 1.414 as before, while the variability would be $\frac{1.414}{15} \times 100 = 9\%$. If, again, the measurements should yield the values 103, 104, 105, 106 and 107, the variability would be 1.35%. In the first case, the objects measured are evidently very variable; in the second, they are moderately variable, while in the third example they are only

slightly variable. I have translated into quantitative terms the impression to which a comparison of the three sets of figures at once gives rise, but which, in the absence of some principle of precise computation, remains an impression and nothing more.

The "variability" of a quantity determined in this way is almost exactly the deviation from the average which one-third of the measurements display.[1] Two individuals out of every three, therefore, may be expected to differ from the average, in respect to the dimension measured, by a less percentage than that indicated by the "variability."

I have determined the variabilities at birth and during the first twelve months of extra-uterine growth of the weights of British infants born in England with the results shown in the table given below.[17]

There is a general tendency for variability of weight to increase with increasing velocity of growth and to decrease with decreasing velocity of growth,[18] [19] so that any given group of infants above the average in weight will generally be found to be more variable in weight than the average, while sub-normal infants are less variable than the average. On the whole, however, it may be inferred from the data given below that the weights of two-thirds of British infants will at any time during the first twelve months of extra-uterine growth lie within 14% of those indicated by the standard average curve. If, therefore, a series of parallel curves be constructed, which differs by successive intervals of 14% from the standard curve, it may safely be inferred that the growth curve of any individual normal infant should never cut two of these parallel curves or at least that such a phenomenon should immediately attract attention and arouse suspicion of abnormal physiological or nutritional conditions.[1]

Age in Months.	Percentage Variability of Weight. Males.	Females.
0	13.2	12.5
1	17.0	14.4
2	16.4	15.0
3	15.8	15.6
4	15.9	15.0
5	14.7	14.5
6	15.1	13.4
7	14.9	14.6
8	13.1	14.0
9	13.8	14.0
10	13.4	11.6
11	15.3	12.5
12	12.6	11.9

[1] More precisely, 68%.

Variability of any bodily dimension alters with age, in consequence of the concurrent alteration of the rate of growth. Thus, during infancy, when growth is very rapid, the variability of weight is, as has been seen, about 14%, while in adults it is about 11%.[10] To the extent that environment influences the rate of growth, therefore, variability will also be affected, although evidently to a very much less degree. The variabilities of Australian infants from month to month during the first year of extra-uterine growth have not yet been determined, but the variability at birth does not differ to any important extent from the variability at birth of infants born in England.[16] Evidently, therefore, we shall not be greatly in error if we assume that the variability of Australian infants during the first year is of similar magnitude, namely, about 14%.

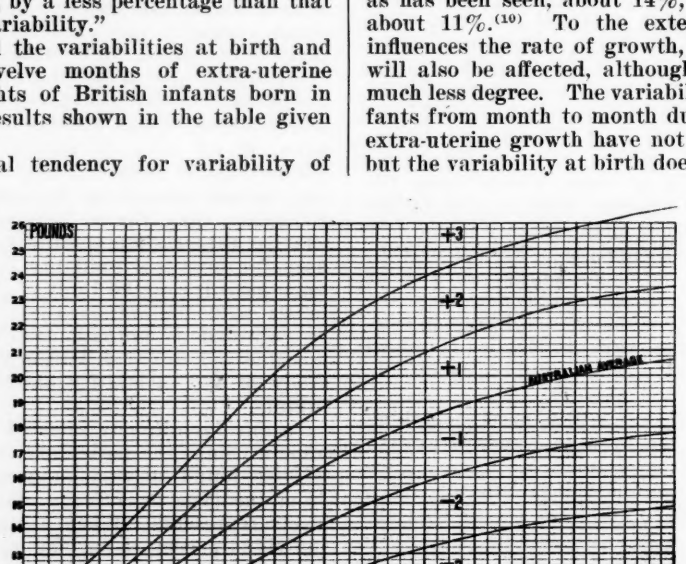

FIGURE I.
Growth Chart for Australian Male Infants.

In the accompanying figures are illustrated growth charts for males and females based upon the average growth curve for South Australian infants, constructed from data accumulated by the Adelaide School for Mothers.[15] The growth of a normal, full-term infant when plotted upon these charts may display considerable fluctuations, yet these fluctuations are very rarely of sufficient magnitude to lead to the inter-section of two of the parallel standard curves. When such inter-sections do not occur the growth curve affords no grounds for assuming that the child's development is other than approximately normal. By the employment of a chart of this description, allowance is made in a logical manner for the normal individuality of "build," while at the same time it is possible with a sufficient degree of precision to distingush fluctuations of development which are probably devoid of practical significance from those which are almost

[1] It is, perhaps, unnecessary to point out that such conditions may be pre-natal, so that the cutting of two curves during the first few months after birth may in such cases merely represent restoration of normal growth.

certainly indicative of conditions deleterious to the child's welfare.

The degree of sub- or super-normality of an infant can also be conveniently designated in terms of the degree of deviation from the normal range of variability. Thus an infant whose curve lies between the normal standard and the curve 14% below it may be described as displaying grade 1 of sub-normality (— 1), a degree of sub-normality which may be expected in 34% of normal infants. An infant whose curve lies between the curve 14% below standard and the next lower curve, may be described as displaying grade 2 of sub-normality (— 2), a degree of sub-normality which may be expected in 13.5% of normal infants. An infant whose curve lies below this may be described as displaying grade 3 of sub-normality (— 3), which should not occur in more than 2.5% of normal infants.

Analagous criteria of normality for older children will be presented in Part II. of this paper.

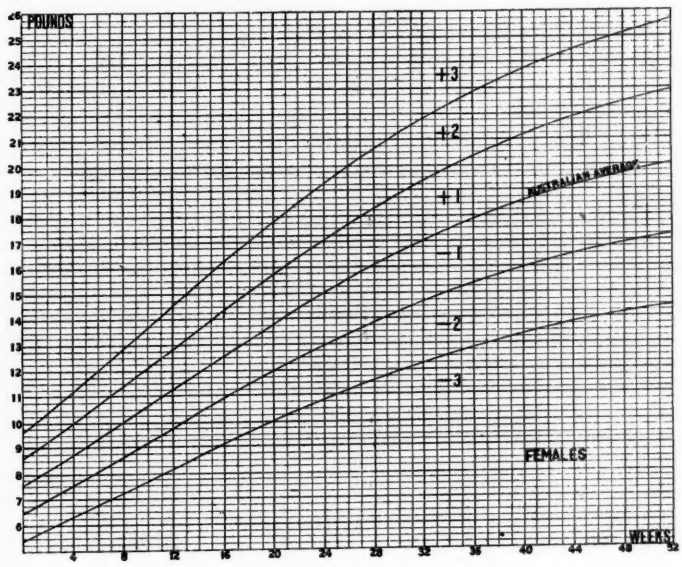

FIGURE II.
Growth Chart for Australian Female Infants.

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PART II.—CHILDREN OF SCHOOL-ATTENDING AGES.

IN part I. of this paper I pointed out that individual deviations from the average standard weight or stature, when they are not too extreme, have very little significance except when viewed with reference to the whole growth curve of the individual under consideration. The bodily dimensions of perfectly normal children vary even more than those of adults and, provided a child is developing along a steady growth curve which is parallel with the normal standard of its sex, race and environment, there is no adequate reason for supposing that it is abnormal simply because it departs rather widely from the arbitrary standard of the average. What is actually required, therefore, in order to estimate the normality of the development of a child, is a means of determining the degree of parallelism of its development with the standard and the degree of probability that a given departure from the standard is normal. These may be ascertained by plotting the chosen dimension (*i.e.*, weight or stature) of the child upon a chart on which are drawn a series of parallel growth curves differing from the standard by successive intervals corresponding to the variability of the dimension.

The changes in weight during the infantile growth cycle are so great and the measurement of weight in infants is so much easier and more accurate than the measurement of stature that there can be no question that weight is the most suitable dimension in infants under one year to serve as the means of estimating development. It is quite otherwise, however, in the case of older children. In the first place, all estimates of the weight of older children in Anglo-Saxon communities are marred by the inclusion of the uncertain weight of clothing. The measurement

of stature, on the contrary, is not affected by clothing, provided that the usual procedure of removing boots or shoes is adopted, the error due to the thickness of socks or stockings being negligibly small. The only serious source of error in the measurement of stature arises from imperfect straightening of the back and neck. Since it is much easier to stand straight against a wall, this source of error might be almost completely obviated by placing the usual type of vertical measure, provided with a projecting arm adjustable to the level of the top of the head, in a narrow recess in the wall, so that the subject can stand braced against the wall while the horizontal arm of the measuring apparatus is adjusted.

The chief advantage, however, of employing stature as a criterion of normality in children is that arising from the comparatively small and uniform variability of height as compared with weight. The variability of weight, even in adults, is at least 10%. That is to say, one in three normal individuals may be expected to depart by more than 10% from the standard average. In infants, as I have pointed out in Part I. of this paper, the variability amounts to 14%, while at intermediate ages variability fluctuates between 12% and 20%, being highest at puberty, when the rate of growth is also greatest.[8] During the period of school attendance, on the other hand, stature increases at an almost uniform rate and its variability is almost uniformly 5%.

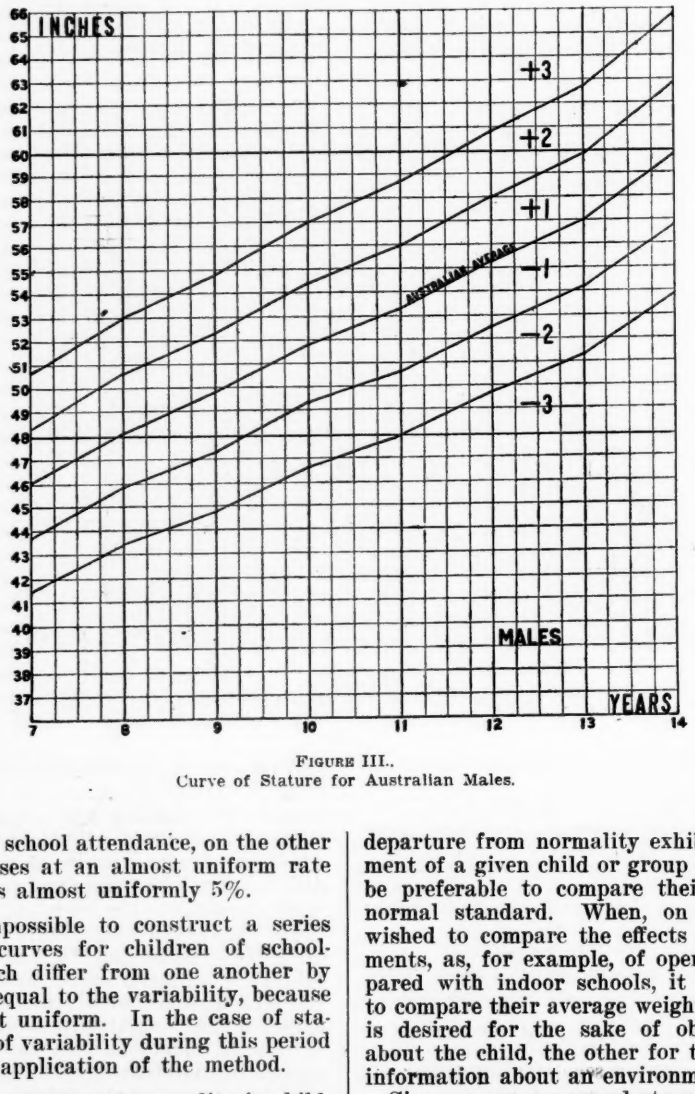

FIGURE III.
Curve of Stature for Australian Males.

It is therefore impossible to construct a series of parallel weight curves for children of school-attending ages, which differ from one another by successive intervals equal to the variability, because the variability is not uniform. In the case of stature the uniformity of variability during this period renders feasible the application of the method.

Furthermore, as a criterion of normality in children of those ages the measure of stature is more reliable than that of weight, because the normal variability of this measure being so very much less than the variabilily of weight, any departure from the standard average has a proportionately greater significance than a like departure from the standard average of weight. Thus in a child of from twelve to fourteen years a departure of 5% from the average stature has fully as much significance as a departure of 15% or even 20% from the average weight. Now, in seeking to compare an individual with a standard with a view to ascertaining the extent to which it exhibits important departures from the normal, it is obviously an advantage to employ a criterion that is not too sensitive, that will not be affected by every slight fluctuation of dietary or environment. If, on the other hand, it is desired to compare different environments[1] in their effects upon growth, then the measure of weight is to be preferred to that of stature, since it is evidently more sensitive to internal and environmental departures from the average and more readily susceptible of measurable modification. Hence in nutrition experiments upon animals growth in weight is quite properly employed as an indicator of the effects of a dietary in comparison with the normal. In investigations of child welfare as evidenced by growth the following practical rule may therefore be applied: When it is desired to ascertain the degree of departure from normality exhibited in the development of a given child or group of children, it would be preferable to compare their statures with the normal standard. When, on the contrary, it is wished to compare the effects of differing environments, as, for example, of open-air schools as compared with indoor schools, it would be preferable to compare their average weights. The one measure is desired for the sake of obtaining information about the child, the other for the sake of obtaining information about an environment.

Since we are concerned at present with the former type of investigation, namely, that which aims at

[1] Using the term "environment" in its widest sense to include dietary.

estimating the degree of welfare of the child, the height standard must be employed.

In all communities there is a lamentable lack of information concerning the dimensions of children at ages lying between infancy and the age of school attendance. Figures are furnished in various works on pædiatrics, but their reliability is very questionable. Usually no information is supplied as to the number of children measured or the criteria employed for excluding abnormal children or the race or class of which they were members. The wholesale application of such uncertain standards can lead only to mistaken impressions and the need is manifestly urgent of obtaining standards derived from selected normal children in sufficient number to furnish reliable averages, with concurrent estimates of variability, so that the extent of departure from the mean which may be exhibited by normal children, may be correctly anticipated.

For children of the ages of school attendance, abundant data have been obtained in all of the leading European countries and in America.[1] Extensive data have also been obtained in Australia and these have been summarized by Dr. R. S. Rogers,[9] who measured the weights and heights of one thousand school children in South Australia. His figures for stature agree so closely with those previously obtained in New South Wales that the average of these two estimates may be regarded as representing the average statures at these ages of the greater proportion of the inhabitants of South and South-Eastern Australia. In Western Australia and Tasmania it appears that the average stature is somewhat in excess of this standard.

The variability of stature in Australian school children has not been determined, so far as I am aware. This, however, is not a serious lack, because the variability of stature has proved to be extraordinarily uniform in all the various instances in which it has been determined. Thus the variability of the stature of English, French, German, American[5] and Australian[6] adults lies in each case between 3.8% and 4%. The variability of the statures of school children in such diverse environments as California[8] and Canada[1] is the same, namely, about 5%. It may therefore be assumed without much liability to error that the variability of stature in Australian school children is also in the immediate neighbourhood of 5%.

In the accompanying charts, the standard of stature is the average of South Australian and New South Wales measurements. The parallel curves differ by successive intervals of 5% from the standard. Of normal children, 68% may be expected to possess statures lying between the pair of curves 5% below and above the standard. Such children may be said to exhibit + 1 of super-normality if the weight is above standard or — 1 of sub-normality if it is below standard. An additional 27% of normal statures will be outside this pair of curves and within the pair which differ by 10% from the average. Such children may be said to exhibit + 2 of super-normality or — 2 of sub-normality. Not more than 5% of normal children should deviate by more than 10% from the standard in either direction, such children being + 3 super- or — 3 sub-normal. It is obviously highly improbable that the growth curve of any normal child will ever cut two of the parallel curves; this would involve such an alteration of bodily proportions as to warrant careful attention and arouse suspicion of some important pathological or nutritional abnormality.

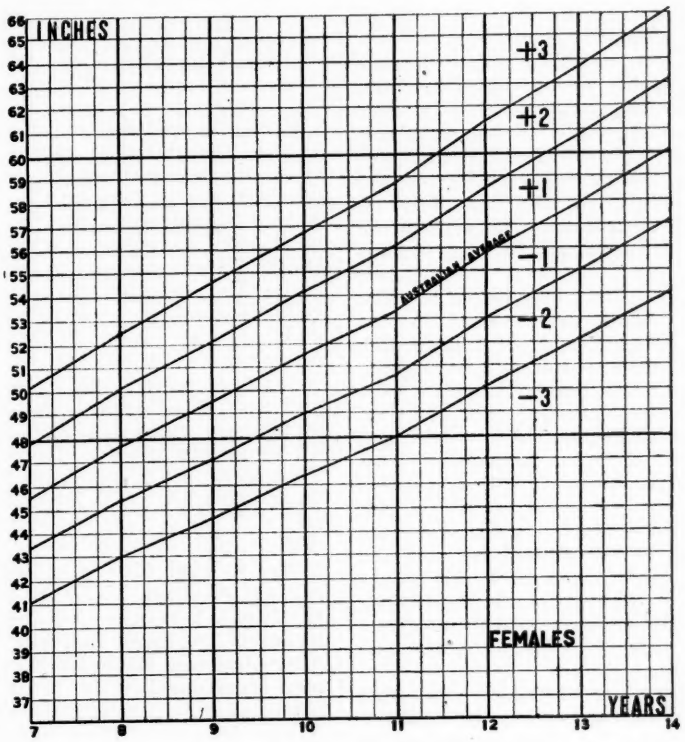

FIGURE IV.
Curve of Stature for Australian Females.

A criterion of normality which has recently been suggested by von Pirquet consists of the ratio of ten times the weight in kilograms to the cube of the sitting height in centimetres.[2] This index he calls the *pelidisi*. It is merely a less accurate variant of the "ponderal index"[3] [7] or cube root of the weight divided by height, which has been employed for the past twenty years by anthropometrists as a means of

[1] The literature is cited in Part I. of this paper.

classifying varying types of "build" or bodily proportion.[4] According to von Pirquet, the *pelidisi* approximates to unity in normal Austrian children, but this constitutes no advantage, being merely an accident arising out of the magnitude of the units of measure chosen and there is no evidence to show that the same value would be normal for children of other races. Indeed, the fact that the ponderal index differs very decidedly in different races renders it extremely probable that if a *pelidisi* of 1 is normal in Vienna, it is not normal elsewhere. Moreover, all normal standards apply, as has been seen, only to the average and in any particular individual a departure from the normal can only be rightly suspected of being sub-normal if it can be shown that it considerably exceeds the normal range of variability, hence the *pelidisi* cannot be applied as a criterion of normality until (*i.*) its standard average value has been ascertained for the race, sex and environment under investigation and (*ii.*) the normal variability of the index has been ascertained.

Even if this information were available, however, there are special disadvantages attaching to the measurement of the *pelidisi*. In the first place, its variability is probably high because it involves the weight of the child. Secondly, a still more serious defect is the inaccurate character of the measure involved in the estimation of sitting height.[4] The sources of inaccuracy which are involved in this measurement are the following: (*i.*) It is more difficult, especially in the case of children, to straighten the back when sitting than when standing. (*ii.*) The sitting height varies considerably with the position of the legs. The thighs should be horizontal and parallel and the feet flat upon the ground. This involves in measuring the sitting height of children the employment of a chair of adjustable height. (*iii.*) The measurement is much influenced by the degree of development of the gluteal muscles and fat deposits and their compression due to the weight of the subject. (*iv.*) Inclination of the head introduces a greater proportional error into the measurement of sitting height than it does into the measurement of standing height.

These sources of error are absent or minimized in the estimation of standing height. If, however, it is desired to supplement the information derived from the measurement of stature by some estimate of the "build" or bodily density of the individual, then it would be preferable to employ the more accurate ponderal index:

$$\frac{100\sqrt[3]{\text{Weight}}}{\text{Height}}$$

or the alternative index of bodily density:

$$\frac{100 \times \text{Weight}}{\text{Height}^3}$$

standard values of which have been determined for a variety of races and ages. For the extensive literature dealing with these indices the reader is referred to Martin.[4]

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THE TREATMENT OF VASCULAR NÆVI.

BY E. H. MOLESWORTH, M.B., CH.M. (SYDNEY),
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SINCE the introduction of new methods of treatment of vascular nævi by radium and carbonic acid snow, the management of these disfiguring lesions has been vastly facilitated. Before these methods were introduced the only practical means of treatment were excision, cauterization or electrolysis. Of these three, excision, where practicable, was the best. The objection to cauterization and electrolysis was and is the invariably ugly and puckered and sometimes keloid scar which they leave. In many cases, excision, owing to the extent and situation of the nævus, was impracticable, hence many patients had either to be left alone or to be treated by methods which gave results often little or not at all to be preferred to the original disfigurement. Therefore, the introduction first of carbonic acid snow and a few years later of treatment by radium met with eager reception by practitioners who were called upon to treat these disfigurements, which caused so much distress to patients or their parents. Strangely enough, before the introduction of radium treatment, X-rays had not been seriously tried as a means of treatment for these lesions. It was only after observing the beneficial effects of radium that men accustomed to the X-ray therapy turned their attention to treatment of vascular nævi by means of X-rays, because of the scientific fact that the radiation given off by an X-ray tube is identical with the γ rays given off spontaneously by radium. Later, with the introduction of the Coolidge tube, a much more constant and homogeneous radiation being possible and a much greater range of penetration obtainable, the use of this means of treatment was more widely exploited than before.

The result of this work has been a very favourable one, but in dealing with a large number of cases by means of X-ray and other forms of therapy certain limitations and difficulties have been discovered. For example, it is now a well-recognized fact that the protuberant nævi of the strawberry variety or even cavernous nævi are much more amenable to treatment by radiation than the more innocent-looking, superficial port-wine stain. Another point is that a nævus which is in active growth, is much more easily treated by these means than is a nævus which has attained its full growth and has become

fixed. It is therefore highly desirable to treat these patients at the earliest possible moment, that is to say, generally within the first six months of life. I regard this as being of the highest importance and, indeed, it is rare that failure to produce an almost perfect result occurs when treatment is commenced early. When once the nævus has become fixed, the result is never so good and complete failure may result. But, even under these circumstances it is always worth a trial first, because, if the nævus prove amenable at all, the result, though not perfect, is almost invariably preferable to that produced by other means, even carbonic acid snow. But in adults, if a single dose of X-rays or radium fail to produce a noticeable improvement, it is not worth while continuing, but it is better to change the method of attack and to use carbonic acid snow or even electrolysis. The reason for this is that persistence in X-ray applications is rather more likely to produce ill-effects on the thin epithelium covering nævoid tissue than on the thick normal epithelium of healthy skin.

Technique.

In suitable cases the method of procedure is as follows: A three-quarter or a full erythema dose of medium to hard (four to six B.W.) X-rays is delivered in one sitting. Of course, the nævoid area alone is irradiated, the surrounding skin being protected either by a suitably-sized localizer or, if such be not available, by a sheet of lead foil or lead rubber tissue with a hole the size of the nævus cut into it. The effect of the application is, of course, not at once apparent, but at the end of ten days there is generally a noticeable engorgement of the nævus which is quite transitory and is followed a week later by distinct flattening and paling of the growth. Three or four weeks after the first application a second dose may be administered; this often results in the complete disappearance of the blood tumour. A third or even a fourth application may be required, but if full erythema doses have been given it is rarely necessary to continue further. Nævi which resist treatment partly or entirely by this means, in my opinion, should be dealt with by other means of treatment, *e.g.*, carbonic acid snow.

In very young children, who cannot be kept still and who will when awake move about, it is better to induce sleep by withholding food for several hours previously and then feeding just before the exposure, when they will frequently sleep during the application; or by the administration of ether for a light anæsthesia, not because the application is at all painful or even productive of any sensation whatever on the skin, but because the noise and crackle of the apparatus is liable to frighten the child. As it is only required to put the child to sleep for five to ten minutes and a true anæsthesia is not sought, the risk is almost negligible and this procedure is quite justifiable. In older children and in adults this is, of course, quite unnecessary.

The advantages of this form of treatment are those which it shares with radium in leaving an almost if not quite imperceptible mark where the epithelium is thinner than normal (this being due to the original nævoid condition rather than the treatment adopted) and the fact that it is quite painless to the patient. After a few years it becomes almost if not quite impossible to detect the site of the nævus, as the epithelium, no longer stretched by the projecting nævoid tissue, developes a normal thickness and transparency. The disadvantage that it shares with radium, is that an overdose or too long continuance of the treatment may, if moderate, produce atrophic changes or, if very marked, ulceration or neoplastic changes. These, however, can be avoided by proper method of measurements and dosage and by refusal to persist for more than a reasonable number of exposures in an endeavour to bring about the cure of the nævoid condition.

The full dose method is much to be preferred in this type of case than the fractional dosage method. An advantage that this method has over radium is the shortness of time required for the exposure, this being measured in minutes rather than hours. Another advantage is that it is very much less costly, the result being brought about by the same radiation is identical in appearance and permanence.

As compared with carbonic acid snow, the pain produced by the application of the latter and the disfiguring through temporary blistering and crusting reaction have to be taken into consideration. The end result in a nævus treated by carbonic acid snow is not as good as that produced even in the more obstinate cases treated by means of irradiation. The site of the nævus generally remains whiter than the surrounding skin and is rather liable to remain as a noticeable cicatrix for the rest of the patient's life.

When comparing with the results of irradiation and those produced by cauterization or electrolysis, the painfulness of the latter methods of treatment and the invariably permanent and often keloid scarring almost always rules them out of court in making a choice of means of treatment. When both the radiation and the freezing method are impossible for any given reasons, excision should be seriously considered before resorting to electrolysis or cauterization.

Points of Interest.

The main points to be remembered then are:

(1) That it is in the highest degree desirable to commence treatment while the nævus is small and still growing, in which case an almost perfect result may be achieved by X-rays or radium.

(2) That treatment by these means is much less reliable after six months of age than before that period and that this intractability increases rapidly with every year that elapses. But even in these cases it is desirable that irradiation methods should be attempted first, since not infrequently a remarkably good result is obtained. In fixed nævi in adult life failure will ensue in a relatively large proportion of cases unless undue risks are taken by administering too heavy a dosage or persisting for too long a time.

(3) In such cases as just mentioned, if no beneficial effect is observed after one or at most two

full doses of X-rays given with a month's interval. it is generally better to use carbonic acid snow applied with pressure varying from light to heavy according to the depth of the nævus for from thirty to forty seconds. The dose is to be repeated when all signs of inflammatory reaction have disappeared.

(4) Electrolysis, in my opinion, is only to be used for spider nævi, where a single puncture in the body of the nævus is sufficient to cure the condition or when the nævus is situated on a covered portion of the body, when excision is undesirable and an ugly scar does not matter. The same may be said to apply to cauterization, either by the actual or electric cautery or by fulguration.

A large number of patients have been treated by the above method in hospital and in private practice during the last ten years and the results achieved by X-rays have been so uniformly good that, except in cases regarded as unsuitable for reasons stated above, this method of treatment is uniformly adopted, since not only are the results as good or better, but the time, labour and expense are less than are involved in the use of other methods of treatment.

THE VACCINE TREATMENT OF GONORRHŒA.

BY THE LATE ALFRED FOSTER, M.R.C.S., L.R.C.P.,
Formerly of New Zealand and Sydney.

THE following notes of my results in private practice may be of interest to the readers of THE MEDICAL JOURNAL OF AUSTRALIA.

Thirty-eight patients were treated, autogenous vaccine only being used. Only early cases, from one week to one month's duration, are included. The ordinary treatment of pre-irrigation days was also employed.

The dosage used was purely empirical, the optimum dose being one which caused no reaction, local or general, and decreased the discharge. Three infections were apparently cured in from two to three weeks. All trace of pus disappeared and did not return after a cessation of treatment for fourteen days.

No severe complications occurred in any of the other patients, though a posterior infection and prostatitis developed in all and the average length of treatment was not in any way shortened when compared with patients not treated by vaccines. The diagnosis of prostatitis was based on the presence of pus in the prostatic fluid following massage.

These notes are based on cases which occurred before irrigation became the usual treatment. My claim to success, in the three patients who did well, is heavily discounted by the fact that I was called on to make a diagnosis for other practitioners. There was evidence of infection in all those. The patients, however, did not return for treatment and subsequently I heard that they had recovered without any treatment at all. I was so astonished at this that I induced them to come up for examination and found no trace of inflammation present whatever. I think spontaneous recovery must be more common than is generally suspected. One of the patients had a sub-frenal abscess and was sent to me because this was mistaken for a chancre. I opened the abscess and he recovered a week or ten days later.

Conclusions.

My conclusions are:

(1) Vaccine may reduce complications, but cannot be regarded as a reliable means of cure.

(2) Though apparently useful when rheumatism is present, it has little curative effect on the focus of infection.

(3) Any dose that increased the discharge, seemed distinctly harmful.

The comments published in THE MEDICAL JOURNAL OF AUSTRALIA on the possibility of the same variations occurring in gonococci as occur in pneumococci is borne out by the variations I found in the growth of the organism. The most striking variation was the occurrence on four occasions in the series of cocci which could not survive transplantation, even on fresh tubes of the same medium or any other medium I had.

I obtained fairly clear evidence, however, that the severity of an attack depended largely on the rapidity with which the organism was transferred from patient to patient. This was particularly noticeable in women, as I found that in practically every acute infection with such a complication as pyo-salpinx, in which I was able to trace the source of the infection almost invariably to the husband, he had handed on the infection within a few weeks of its inception.

I examined large numbers of patients with urethritis. Unfortunately, I have not kept records of my findings, but I very soon found that many more cases are due to other organisms or to attempts at prophylactic disinfection by the patient than I had thought possible. I found that it was a safe rule to advise the cessation of all treatment till a definite diagnosis was made.

Technique.

My technique consisted in:

(1) Smears of visible pus.

(2) Washing out the urethra with small quantities of sterile water and making smears of the result.

(3) Cultures.

The finding of an intra-cellular, Gram-negative organism was considered adequate evidence of infection.

Cultures were made in every case in the last few years I was in practice, as I frequently obtained a growth of the cocci, although the pus was apparently germ free.

I remember being able to demonstrate gonococci in only three women.

The class of woman who transmits gonorrhœa, is very reluctant as a rule to submit to adequate examination, so that the number examined was small.

Reports of Cases.

A CASE OF IDIOPATHIC PARTIAL RUPTURE OF THE SIGMOID COLON WITH HÆMORRHAGE INTO THE PERITONEAL CAVITY.

BY ROBERT SOUTHBY, M.B., B.S. (MELB.),
Resident Medical Officer, Melbourne Hospital.

J.W.K.C., aged sixteen years, a factory hand, was admitted to the Melbourne Hospital on November 24, 1921, at 10.45 p.m., complaining of pain in the lower part of the abdomen and vomiting.

The pain commenced suddenly in the left lower part of the abdomen four days before admission and was severe and continuous in character and spread over the whole lower abdomen. He vomited several times soon after the onset of the pain, the vomitus consisting of food taken previously. After it had lasted for two days, the pain subsided and returned two days later, again accompanied by vomiting. This time he had occasional twinges of pain in both shoulders. He also noticed a swelling of the scrotum and in the right inguinal region. He had had no shivers nor sweats, no jaundice, no hæmatemesis nor melæna. The bowels had been regularly opened. There was no scalding or frequency of micturition. He had had a similar attack three months previously, which had lasted for two days. No history of injury was obtained.

On examination his temperature was found to be 37.4° C. (99.4° F.), his pulse-rate 86 and respiration-rate 22. The pupils were equal, round and reacted normally. There was a left-sided internal strabismus and an old paresis of the left side of the face. His teeth were in a moderately good condition. The tongue was rather dry, with a yellow fur. His breath was foul. The abdomen moved well with respiration. There was slight distension of the lower part of the abdomen and some bulging over the right inguinal region. Tenderness was present over the whole of the lower abdomen, with maximum intensity over the left iliac fossa, but no rigidity. The scrotum on the right side was slightly full; on pressure it emptied almost completely, giving rise to a swelling along the right inguinal canal, terminating at the inguinal ring; it was dull on percussion. The right inguinal ring was larger than the left and there was a slight impulse on coughing. The right testis was palpable and it appeared to be much smaller and softer than normal and to be atrophic. The left testis had never descended and could not be felt in the scrotum or inguinal canal. The left inguinal ring was small and there was no impulse on coughing. By rectal examination no tenderness was elicited and no mass was palpable. The apex beat of the heart was situated in the fifth left inter-space, nine centimetres from the mid-line. The cardiac dulness did not extend to the right of the sternum and the sounds were clear. The breath sounds were normal. The urine was acid; its specific gravity 1,020; it contained no albumin, sugar, acetone nor diacetic acid. Microscopic examination revealed only an occasional pus cell.

The patient was seen by Mr. T. H. Boyd and the diagnosis was thought to lie between torsion of an undescended testicle or an inflamed, unusually placed appendix.

Laparotomy was performed, a mid-line, sub-umbilical incision being made. When the peritoneum was opened a good deal of blood escaped. The abdomen was mopped out and an undescended testicle was then seen on the left side, hanging from the peritoneum into the abdomen, just inside the internal inguinal ring. It was normal in size and appearance.

The appendix was long and thickened and it was removed. On searching for the site of the hæmorrhage an elongated sigmoid colon was found lying up towards the left kidney and it was seen to be coated about the middle of its outer aspect with a large mass of blood clot. This was wiped away and it was found that the peritoneal and muscular coats were torn for 6.5 centimetres along the convexity of the bowel, with further stripping up by the clot of these layers to the mucous layer of the bowel, which seemed to be intact but thickened. About 2.5 centimetres proximal to this was a small, rounded nodule, the size of a pea, on the mesenteric edge of the bowel, which, when incised, appeared dark brown and semi-solid in consistency, resembling old blood clot or new growth.

It was difficult to decide whether the condition was new growth with hæmorrhage or a simple hæmorrhage with thickening of the sub-mucous walls of the bowel, so about 12.5 centimetres of the sigmoid colon, including the affected portion, was resected and an end-to-end anastomosis performed. Numerous vessels in the meso-sigmoid had to be ligated and the mesenteric borders of the two pieces of bowel were firmly united with fine chromic gut. The two ends were then united with similar material and the line of union covered over by suturing the serous coats also with fine chromic gut. The abdomen was then closed in the usual manner and an anchor dressing applied.

On returning from the theatre his pulse-rate was 108, his respirations were 26 and his temperature was 36.6° C. (98° F.) and he was rather blanched and shocked. His condition remained unaltered for three days, the temperature not rising above 37.2° C. and pulse-rate not more than 114. He then commenced to have considerable pain in the lower part of the abdomen and the abdomen became slightly distended. His bowels were not opened, in spite of the fact that he was having magnesium sulphate and cascara and pituitrin regularly. A short rectal tube was passed with but slight effect.

Although he was feeling quite comfortable and the abdomen was not distended and quite soft, his bowels were not opened until the eighth day after operation.

From this stage onwards the diet was gradually increased and the patient made an uninterrupted recovery and was discharged on the twentieth day after operation.

The piece of sigmoid colon resected at operation was examined microscopically by Dr. C. H. Mollison, whose report was as follows: "Section of bowel wall shows hæmorrhage in the sub-mucous tissue; the mucous membrane is normal."

I am indebted to Mr. T. H. Boyd for permission to publish the notes of this case.

Reviews.

MENTALLY DEFICIENT CHILDREN.

THE appearance of a fifth edition of "Mentally Deficient Children," by Drs. G. E. Shuttleworth and W. A. Potts,[1] speaks for the capable way in which the authors have dealt with the problem of the feeble-minded child.

The book contains an effective account of the working of the *Mental Deficiency Acts* in England and Scotland, with references to similar Acts in other countries. The ætiology of mental defect is fully discussed and the various pathological types clearly defined and differentiated.

While favourable comment is made on the value of intelligence tests, particularly the Stanford revision of the Binet scale and the tests devised by William Healy, no hard-and-fast rules for diagnosis are laid down, the authors wisely remarking that they "do not consider any sets of tests yet put forward as completely satisfactory in determining whether a particular individual is defective or not."

The training of defectives in special schools and institutions is a feature of the book and is dealt with at length from the methods applicable in the case of the low-grade imbecile up to the training of high-grade morons in industrial occupations. The treatment of this subject is supported by many years of experience in special educational methods based on physiological principles. The time-tables in use in the London County Council special schools are included among the appendices.

The book occupies a conspicuous place in the literature relating to mental deficiency and has an essentially practical value for those interested in this subject.

[1] "Mentally Deficient Children: Their Treatment and Training," by G. E. Shuttleworth, B.A., M.D., etc., and W. A. Potts, M.A., M.D., etc.; Fifth Edition; 1922. London: H. K. Lewis & Company, Limited; Crown 8vo., pp. 320, with twenty-nine illustrations, including twenty-one plates. Price: 10s. 6d. net.

Public Health.

THE PLAGUE OUTBREAK.

BULLETINS Nos. 38, 39, 40, 41, 42 and 43, dealing with plague in Australia, have been issued by the Department of Health for the Commonwealth on April 7, 13, 21, 28, May 5 and 12, 1922, respectively.

General.

The Queensland Government issued on March 30, 1922, plague regulations for the control of goods traffic and epidemic diseases regulations. The former includes a new regulation for the provision of rodent-proof packing for all goods conveyed by rail, boat or other conveyance and a second new regulation imposing restriction on the removal of goods from any premises in which a person suspected of plague has resided or has been employed as well as from premises where a person has resided or been employed who is suffering from undoubted plague or where a plague-infected rat or mouse has been found.

The second progress report of the Metropolitan Joint Health Board of Brisbane gives an account of the measures adopted to deal with the infection. The area within which adequate garbage bins are supplied to householders, has been considerably extended. Information is available concerning prosecutions for carelessness in regard to the exposure of food and similar offences. It is announced that the rat destruction operations were being conducted without relaxation. A special gang of men was being employed on the river frontages and wharves, traps were being set and in many cases rat burrows were being dug out and obliterated. The work of the spraying gangs appears to have been extensive. It is stated that assistance was being given by householders and managers of firms. Daily spraying was being carried out in theatres, picture theatres and all enclosed places of amusement. Periodical attention was being given to courts and public buildings. Boarding schools and kindergartens had been sprayed for fleas.

The third progress report of the Joint Health Board contained an account of the measures taken to enforce the regulations dealing with the rat-proofing of new buildings. Special precautions were adopted to prevent careless people from leaving edible food and horse fodder in open spaces. The work of the destruction of rats and fleas was continued on the block system. Other sanitary measures were also being enforced. It is stated that up to March 18, 1922, 48,910 rodents had been caught and examined and of these 178, or 0.36%, had been found to be infected. The incidence of infection had decreased to 0.05% in the period from February 20 to March 18, 1922.

On May 1, 1922, modified regulations concerning the fumigation of vessels came into force. Overseas vessels are fumigated throughout when empty and before loading is commenced. Australian vessels are required to be fumigated when empty at monthly intervals, if possible at the terminal ports on alternate voyages. Rigorous inspection is to be carried out on each arrival at a terminal port and fumigation may be ordered if evidence is discovered of rat multiplication. These provisions will not apply in the case of vessels trading between ports of one State and of vessels trading between Brisbane and the northern rivers of New South Wales. In these cases the old regulations will be applied. Vessels trading between New Zealand and uninfected ports in Australia will be fumigated at intervals of two months.

Plague in Man.

During the period from March 25 to May 8, 1922, no fresh infections have been notified in Queensland. There was one patient admitted during the last week of March on suspicion of plague to the Isolation Hospital, Wattlebrae, Brisbane, but he was discharged. Similarly, a patient was admitted early in April, but the illness was found not to be plague.

Two fresh infections were notified in Sydney on April 4 and 10 respectively. The first patient was a child, aged seven years, residing at Alexandria, and the second was a man from the same district. Fuller particulars are published of the sources of infection of five patients whose illness was recorded in previous issues of the *Bulletin*. Between April 5 and May 8, 1922, sixteen infections were notified in Sydney.

Plague in Rodents.

Particulars are given of the rodents trapped and examined in various parts of Queensland between the middle of February and May 6, 1922. From the tables it appears that from two to four thousand rodents were destroyed each week in Brisbane. The total number destroyed in the period was over thirty-one thousand, of which 26,016 were examined in Brisbane. Thirteen infected rodents were discovered.

Large numbers of rats and mice were destroyed in Sydney and many of them were examined. Between April 1 and May 11, 1922, thirty-six infected rodents were discovered. No further infected rodents were found on board ships arriving at Sydney and Newcastle since the arrival of the *Wyreema*.

Naval and Military.

APPOINTMENTS.

THE following information has been published in the *Commonwealth of Australia Gazette*, No. 38, of May 4, 1922:

Permanent Naval Forces of the Commonwealth.

SEA-GOING FORCES.

Extension of Appointment.

THE temporary appointment of SURGEON-LIEUTENANT ROBERT MARTIN, M.B., M.S., is extended for a period of two years from 28th January, 1922.

Australian Military Forces.

THE Governor-General in Council has approved of the following changes, etc., being made in connexion with the Australian Military Forces:

FIRST MILITARY DISTRICT.

Reserve of Officers.

To be Lieutenant-Colonels—MAJOR (HONORARY LIEUTENANT-COLONEL) A. HORN and CAPTAIN (HONORARY LIEUTENANT-COLONEL) W. A. FRASER, D.S.O., 1st March, 1922.

SECOND MILITARY DISTRICT.

Australian Army Medical Corps.

THE resignation of MAJOR G. E. MAROLLI of his commission is accepted, 15th April, 1922.

Reserve of Officers.

To be Lieutenant-Colonel—MAJOR (HONORARY LIEUTENANT-COLONEL) J. R. M. BEITH, D.S.O., 1st March, 1922.

To be Majors—CAPTAINS (HONORARY MAJORS) E. S. HARRISON and F. C. CUTIS-ELLIOTT, 1st March, 1922.

THE appointment of W. BLAXLAND to be Honorary Captain (temporarily) is terminated, 19th October, 1921.

THIRD MILITARY DISTRICT.

Australian Army Medical Corps.

CAPTAIN DONALD MURRAY ROSS is appointed from the Reserve of Officers, 20th April, 1922.

To be Lieutenant (provisionally)—GERALD JOSEPH KENNEDY, 10th February, 1922.

Reserve of Officers.

HONORARY CAPTAIN A. O. V. TYMMS is transferred to the Reserve of Officers, Sixth Military District, 10th April, 1922.

THE resignation of CAPTAIN W. A. GRAHAM of his commission is accepted, 2nd April, 1922.

FOURTH MILITARY DISTRICT.

Reserve of Officers.

THE appointment of HONORARY CAPTAIN E. W. MORRIS is terminated, 2nd October, 1921.

SIXTH MILITARY DISTRICT.

Reserve of Officers.

HONORARY CAPTAIN A. O. V. TYMMS is transferred from the Reserve of Officers, Third Military District, 10th April, 1922.

The Medical Journal of Australia

SATURDAY, MAY 27, 1922.

Intermediate Hospitals.

THE term "intermediate hospital" has been introduced to indicate a place at which institutional treatment of disease is provided to persons of limited means at a cost less than that charged at a private hospital. The term may be accepted, although it is not entirely satisfactory. It has one virtue; it implies that this institution stands midway between the public hospital, at which the indigent sick receive institutional treatment during illness free of all cost, and the private hospital, where full fees are charged. If this definition be accepted, the establishment of intermediate hospitals would have the logical effect of abolishing the practice of requiring patients to pay maintenance fees at public hospitals.

A little more than a year ago the Council of the Victorian Branch of the British Medical Association was aprpoached by the Private Hospital Employers' Association with a proposal that a certain number of beds would be reserved in several private hospitals for persons who could not afford to pay full fees. The Council approved of this suggestion and a list of private hospitals was published in THE MEDICAL JOURNAL OF AUSTRALIA at which accommodation for persons of small means was provided at reduced charges. The movement was limited and was obviously but a temporary expedient calculated to serve a useful purpose pending the introduction of a more comprehensive scheme for meeting the requirements of a large section of the community.

If the principle be recognized that the public hospitals are places where the sick poor receive medical and nursing attention during illness, it follows that the majority of persons in our cities and larger towns are heavily handicapped. They would be excluded from the public hospital and they could not afford the heavy expenses of the private hospital. This defect in the system has been recognized for many years. Several years ago an endeavour was made in London by members of the medical profession to establish a self-supporting hospital in St. Vincent's Square, to meet this requirement. One institution of this kind in the greatest city in the world was as a drop of water in the ocean. The more recent movement in Birmingham, too, must be regarded merely as an experiment. But it has been demonstrated that it is practicable to establish and maintain hospitals of this kind, provided that they contain not less than eighty beds each and provided that they are managed in a manner acceptable to the medical profession. In our own cities something similar has been attempted. Denominational hospitals have been instituted at which a limited number of beds are available at relatively low maintenance fees. There is, as far as we are aware, no hospital in Australia which can claim to be a pure intermediate hospital.

From the sociological point of view it will be admitted that the man of small means has a right to demand special provision for institutional treatment when he or those dependent on him fall ill. He must not be pauperized by being granted gratuitous treatment at the public expense and at the expense of the medical profession. The members of the staffs of the public hospitals render honorary services on the understanding that it may be claimed only by those in poor circumstances. He can afford to pay two or three guineas a week for a limited time and, in addition, he is able to pay a moderate fee to his doctor. Unless the fundamental basis of the public hospital scheme be altered, it would seem to be necessary that he should be given a special hospital suited to his pocket. Few people regard a compromise such as that introduced by the proprietors of the private hospitals in Victoria as satisfactory. The reduction of fees usually means a financial loss to the proprietors, who conduct the hospitals as commercial undertakings. Moreover, the number of beds available under the most propitious circumstances must remain hopelessly inadequate. It would therefore seem that a series of large intermediate hospitals should be established under conditions satisfactory to the medical profession. These hospitals could be established by private persons, either under the auspices of a

church or otherwise; they could be established by a government or they could be established by members of the medical profession. Private ownership would involve the grave disadvantage of irregular control. If the institutions were self-supporting, it would be practically impossible to impose conditions of administration, unless medical practitioners refused to use the hospitals until the medical profession was given a controlling voice in the administration. The experience in New South Wales teaches us that the average cost per occupied bed in hospitals amounted in 1919 to £97 for institutions with between forty and one hundred beds and £145 for institutions with over one hundred beds. Some of the metropolitan hospitals appear to be extravagantly managed; the cost per occupied bed was between £180 and £190 in these institutions in 1919. It may therefore be accepted that to-day in any city in the Commonwealth a well-managed and economically administered hospital could be maintained at a cost equivalent to £150 per occupied bed, provided that the institution had not less than eighty beds. If the maintenance fee were fixed at two guineas a week, it would be necessary to obtain a government subsidy. In such an event the conditions of management could be dictated, even with private ownership. If three guineas a week were charged, it might be possible to manage without assistance. But it will be seen that the margin is very small and a few empty beds would mean financial loss on the undertaking. If the ownership were vested in medical practitioners, the basis of management and control would be easily devised to satisfy the medical profession. Government control, as we know from experience, is to be resisted. Under all circumstances the medical profession should have adequate representation on the boards of control. The support of the profession should be conditioned by the acceptance of certain principles, such as those laid down by the Council of the Victorian Branch of the British Medical Association. These include the freedom of all practitioners to attend their own patients in the hospital, the exclusion of out-patient departments, the recognition of one class of patients only, the determination of suitability of a patient for admission by the usual medical attendant and similar provisions. The questions of ownership and of the relations between the institutions and the government must be determined by the medical profession through its representative organization in each State. If the members of the profession stand loyally behind the Councils of the British Medical Association, a satisfactory solution of a very difficult problem should be reached. The future of the whole hospital question will probably depend on the manner in which this matter is handled.

ACUTE PULMONARY ŒDEMA.

No condition is so sudden and unexpected in its onset or so fraught with immediate danger to the patient in whom it manifests itself as acute pulmonary œdema. The text-book literature on the subject is very scanty and the cases reported from time to time in the various journals are by no means numerous. When these reported cases are investigated *seriatim*, it is usually found that the disease has manifested itself in a patient who has been suffering from some cardio-vascular or renal lesion. This lesion may not have produced any symptoms in the patient concerned, but it has nevertheless acted as the underlying cause of the catastrophe which has subsequently developed. The suddenness of the onset, the accompanying well-marked lividity, the extremely violent and urgent dyspnœa, the acute mental and physical distress produced, the exuberant foam, either clear or blood-stained, issuing continuously from the patient's nose and mouth, all unite to form a clinical picture that is at once typical and unmistakable.

Most writers on this subject appear to agree on the apparent relationship between the occurrence of acute pulmonary œdema and cardio-vascular disorders. Huchard actually went so far as to state that aortitis and peri-aortitis were the only causes of the condition. This view of the matter, however, cannot be borne out clinically. It has often been asked whether acute pulmonary œdema could develope as an independent condition, apart from any underlying or predisposing cause in the cardio-vascular or renal systems. Strumpell claimed that in very rare cases an apparently primary acute pulmonary œdema had been seen to develope with a speedily fatal termination in apparently healthy men. The necropsy in these cases had given no further explanation of its origin and he was of the opinion that they were due to sudden failure of the left ventricle.

Dr. Frederick G. Corbin has written an interesting and full report of such a case.[1] Dr. Corbin states that he had been asked in 1915 to attend a woman, aged twenty-four years, who had a normal confinement five years previously. He had known her personally for seventeen years as a healthy woman. He had examined her urine several times for albumin, but had found none. When the patient

[1] *Surgery, Gynecology and Obstetrics*, April, 1922.

subsequently entered in the first stage of labour in the early morning, she made a good deal of voluntary effort, but not more, in Dr. Corbin's opinion, than is usual in the case of other patients. A healthy male child, weighing three kilograms, was born and the placenta was normally expelled. About ten minutes later the patient suddenly became gravely ill. Her state was alarming. Her general appearance gave the impression of imminent death from asphyxia; her pale face covered with sweat, her cyanotic lips, her nostrils dilating with each inspiration, her anxious expression and feeble, almost imperceptible voice, were indications of the urgent need for air. Auscultation of the chest revealed vesicular respiration, with innumerable crepitant and subcrepitant râles throughout both lungs. A hypodermic injection of 1.5 centigrammes of morphine was immediately given and five minutes later she began to bring up frothy, blood-stained liquid. In an hour this liquid measured more than a litre. The patient gradually recovered and by the end of the same day was comfortable. On the following day the urine was shown to be normal.

Dr. Corbin saw the patient every few months from 1915 to 1920 and often examined her heart. He states that she had been seen by several specialists and her urine and blood had been examined repeatedly. Her blood serum had not reacted to the Wassermann test. In 1919 she had an attack of influenza with severe congestion of the lungs, but no œdema. In April, 1920, the patient again became pregnant and after consultation the pregnancy was allowed to proceed. The urine, heart and blood pressure were examined every fortnight and nothing abnormal was discovered. Only one thing was noted; it was a constant fear on the part of the patient of a recurrence of attacks. In November the patient had her first recurrence of œdema. It was milder than the first attack. Only two hundred grammes of fluid were coughed up and the injection of one centigramme of morphine and 0.5 milligramme of atropine produced immediately relief. Several similar attacks occurred before January 2, 1921, when the final attack supervened. The morphine in this instance did not give the usual relief and distress became more acute. The amount of fluid expelled was estimated at about two litres. No autopsy was allowed.

In discussing the treatment of acute pulmonary œdema it is necessary to remember that the condition may be caused by some underlying lesion of old standing or develope as an independent entity from mechanical or nervous causes. In the former case venesection and judicious stimulation with eliminative treatment will be found of use. Chloroform inhalations have been successfully used in some cases. Where there is an associated arteriosclerosis, venesection and the hypodermic injection of atropine have sometimes been the means of cutting short an attack. In a case such as that quoted by Dr. Corbin, when no accompanying lesion can be discovered, morphine and atropine should be used hypodermically. In any case, the outlook is exceedingly grave and a fatal attack sooner or later generally supervenes. For these reasons acute pulmonary œdema must always be regarded as an accident that is liable to be met at any time in medical practice, an accident in the event of which the practitioner must be prepared to act immediately and without hesitation.

THE RUSSIAN FAMINE.

THE story of the great famine in Russia has been told many times over by many people. It has been told in different ways according to the temper of the teller and of the listener. Some are sceptical; others claim that they have enough to do to look after the needy near at hand; others shudder at the tale and thank their fate that they are thousands of miles from the scene of such appalling suffering. If the real facts were known, perhaps there would be less hesitation and more charity. Perhaps the help might be more generous and liberal, if it were realized how intimately the famine of southern Russia affects the cost of all commodities throughout the whole world. Dr. René Sand, the Secretary-General of the League of Red Cross Societies, has collected the evidence and has marshalled the facts supplied by that great arctic explorer and altruist, Professor Fridtjof Nansen, by Mr. Hoover, the President of the American Relief Administration, and by their co-workers. His story was given to a meeting of Belgians in February of this year.[1] He points out that all famines are caused by drought and the present condition of thirty-three million people in the south-east of Russia has been determined by a severe drought in 1920 and a worse one in 1921. It must be remembered that the affected area has been known as the "granary of Europe." In good years the crops satisfy the local needs and the great surplus provides cheap and wholesome food for millions outside Russia. The peasants, so Dr. Sand informs us, are peaceful, ignorant and trusting people, who hold no views for or against communism or soviet government. They have not been taught modern methods of farming and consequently disaster is only too prone to overtake them. They are without horses; these were all requisitioned by the army. They are without cattle; these have all died of starvation and have been eaten. They are without seed; this has been burned up in the pitiless, scorching rays of the sun pouring down on the arid plains. They fail in their ploughing, because they have scarcely enough strength to walk. Already nineteen millions are perishing from want of food and prosperous villages of yore are now pestilential spots, where louse-borne typhus has finished the devastation begun by hunger. Dr. Farrar, the representative of the League of Nations, gives a gruesome story of the utter hopelessness of the position at the beginning of the winter and at the fringe of the famine area. He tells of the desperate straits which have compelled men and women to eat dead dogs, dead cats and even dead human beings. Parents have abandoned their children and have lain down to die, because the relief organization reaches the children more easily than it reaches adults. Much is being done, but more has yet to be faced. The message he sends is that twelve shillings can save one life.

[1] *The World's Health*, February, 1922.

Abstracts from Current Medical Literature.

MEDICINE.

Malaria.

C. LANE (*Tropical Diseases Bulletin*, February, 1922) reviews the work done in connexion with malaria during and since the war. He discusses the reports and treatises of a number of authors who had considerable experience of malaria in recent years. There is still no complete agreement as to whether there are several stable or one polymorphic species of malarial parasite. In this connexion Lane emphasizes the fact that malarial parasites may easily be missed in a thin blood film, so that in any patient, if a benign tertian parasite be found at one examination and crescents at another, it does not follow that the patient has not harboured both types all the time. This fact has been overlooked to some extent by those who favour the view that there is one type of parasite which can become transformed in man or in the mosquito into the other known varieties owing to some atmospheric or telluric influences. It has recently been shown that malarial parasites may be dormant in mosquitoes in cold weather and may resume development in warmth. There seems little doubt that ordinarily the parasites "hibernate" in man. It has been noted that quinine suppresses symptoms when used as a prophylactic and that numbers of infected individuals not showing symptoms thus act as carriers. Rupture of the spleen has been reported in a number of cases. Castellani has shown that glycosuria may be malarial in origin and Acton and Knowles proved that specific gravity of the blood is lowered in malaria. The danger of abortion from fœtal death is greater than the risk of quinine administration according to Acton and others. Quinine is still regarded as the best treatment; it seems that it is a specific for malignant but not benign tertian malaria. Malignant tertian is difficult to control; but, once controlled, less liable to relapse than benign tertian. It has been again shown that disinfestation is a fractional process, each eight weeks' course of 1.8 grammes of quinine daily cures about 25% of those infected with benign tertian and 90% of malignant tertian infections, so that one course of quinine is not sufficient, the number of courses necessary for cure depending on the type of parasite. Oral administration is still the best usual route for giving quinine. Acton has found cinchona derivatives, such as cinchonidine and quinidine, more valuable than quinine salts. Salvarsan and other arsenical preparations are advocated in cachectic states, but they may cause serious complications. Under prophylaxis there is litlte that is new but, since it is now known that the flight range of the mosquito is several miles, the problem has become more difficult.

Chronic Nephritis.

A. I. RINGER (*American Journal of the Medical Sciences*, June, 1921) discusses the diagnosis, prognosis and treatment of chronic nephritis in all stages. He considers that cases of this disease should be classified according to their disturbed physiological function and not according to their supposed pathological condition. In regard to ætiology, he thinks that infection, exposure, pregnancy, etc., are the precipitating causes of nephritis, but that patients who develope nephritis, are predisposed to it from birth, the kidneys being the weak link in the chain—the *pars minoris resistentiæ*. He divides the patients into four groups. The first group have no symptoms, the only evidence of nephritis being a trace of albumin and a few casts in the urine and perhaps a blood pressure of 140 to 180 mm. Hg.. The second group may complain of tiredness, dizziness, headaches, slight dyspnœa or palpitation. They have a blood pressure higher than that of the first group, but the urinary findings are similar. The third class complain of insomnia, anorexia, œdema, præcordial pain, etc., in addition to lesser symptoms, and have a blood pressure of 180 to 280 mm. Hg.. The fourth group are mostly bedridden and have symptoms referable to the cardio-vascular, gastro-intestinal or nervous systems, with a large amount of albumin and numerous casts in the urine. The prognosis is estimated clinically and by three functional tests, (*i.*) The phthalein test, which is normal in the first three groups. (*ii.*) The estimation of the excretion of nitrogen, chlorides and water in the day urine compared with the night urine. Nocturnal polyuria and increase of nocturnal excretion of nitrogen and chlorides indicates damgade kidneys. This is more delicate than the phthalein test. (*iii.*) Estimation of uric acid, urea nitrogen and creatinine in the blood. This is the most valuable test for prognosis. In the treatment a regular quiet life, rest in bed with a moderate diet and small doses of bromide for minor symptoms and symptomatic treatment in the later stages are the only methods of value.

The Common Cold.

G. T. PALMER (*Journal of Laboratory and Clinical Medicine*, October, 1921) has made an investigation into the subjects of ventilation and the weather as they affect school children in America. Fifty schools were investigated. The methods of ventilation in these were by windows (natural), by plenum and by exhaust fans (mechanical). In some of the schools ventilated mechanically the air was moistened by mechanical means. It was found that the sickness rate varied in all the schools, but that on the whole it was less where the ventilation was by natural means and that it was greater in mechanically ventilated schools when the air was humidified. Coryza, laryngitis and bronchitis were the diseases mainly studied. These respiratory affections are more prevalent in schools ventilated by forced draught and gravity exhaust than in those with windows and gravity exhaust, but ventilation does not affect the sickness rate as much as outdoor weather influence. Respiratory affections increase with the onset of cold weather and they diminish with the advent of mild weather in the spring. Wind and humidity accentuate the temperature influence. Abrupt changes of temperature do not influence respiratory illnesses as much as might be expected from everyday experience.

Bilirubinæmia.

H. VAN DEN BERGH (*La Presse Médicale*, June 4, 1921) has published the results of his researches and some notes on recent contributions to the literature on the subject of the percentage of bilirubin in the blood in health and in disease. The degree of bilirubinæmia is measured by a reaction between bilirubin and a mixture of sulphanilic acid, concentrated hydrochloric acid and sodium nitrite which is known as diazonium. The normal bilirubin content of the blood is 0.2 to 0.6 per 200,000 units. The reaction alteration in the bilirubin content is due to obstruction of bile channels, excessive hæmolysis or deficient secretion of bilirubin by the liver cells. In intense jaundice due to obstruction the bilirubin content rises as high as 50 per 200,000 units. In cases of biliary calculus the bilirubin content is normal, except during acute attacks, when it rises. In cirrhosis and tumours which compress the bile channels the content rises before jaundice appears. Bilirubin does not appear in the urine till the blood content exceeds 4 per 200,000 units. It can be produced by blood destruction and this occurs in hæmolytic icterus and the jaundice of pernicious anæmia. The bilirubin content is much increased in these disorders and in *icterus neonatorum* and in some cases of malaria and lobar pneumonia. The author states that this method is of use in the diagnosis of pernicious anæmia, in that the bilirubin content is normal in this disease, except during the periods of extensive blood destruction, when it is increased, and that in pernicious anæmia the reaction occurs slowly, whereas in obstructive hyperbilirubinæmia it occurs quickly.

Malarial Glycosuria.

A. CASTELLANI AND J. G. WILLMORE (*Journal of Tropical Medicine and Hygiene*, November 15, 1921) have reported two cases of malaria in which glycosuria occurred. One patient had 8.5 grammes of glucose per litre of urine and the other had 2% of sugar. In both instances the glycosuria disappeared following intensive treatment with quinine (0.6 gramme) thrice daily by mouth and six intra-muscular injections of 0.9 gramme of quinine hydrochloride. The patients were not put on anti-diabetic diet and no restriction was made on the carbohydrate intake. Both patients had suffered from malaria for about four years.

NEUROLOGY.

Epilepsy.

PERCY SARGENT (*Brain*, Vol. XLIV., Part III., 1921) in his presidential address to the Section of Neurology of the Royal Society of Medicine, said, firstly, in regard to the fits which follow gun shot wounds of the head, that the local morbid conditions fell into three groups: (*i.*) Recent lesions, such as local contusion associated with small hæmorrhages and œdema; or the more gross disruptive effects of a penetrating wound. (*ii.*) Inflammatory lesions due to recrudescent sepsis. (*iii.*) Cicatrices binding the scalp to the brain and membranes through a cranial defect. Of these groups the third was by far the most important. Approximately 4.5% of persons with old gun shot wound of the head suffered from epileptic fits. One very important cause of fits was fixation of the brain at the point of damage to the overlying membranes and scalp. In such conditions operation was advisable, in order to restore the mobility of the brain and close the bony opening by means of sheets of celluloid. Sargent has operated on 200 patients by this method, but withholds judgement upon the results, excepting to say that they are remarkably promising. Secondly, concerning fits other than those of traumatic origin, there were three classes: (*i.*) Those due to recognizable and localizable gross lesions, such as tumours, in which the result depended upon the nature of the growth and the completeness with which it could be removed. (*ii.*) Those due to focal epilpesy, in which the nature of the lesion, if any, could not be ascertained without inspection of the brain. In patients thus affected, exploration, within limits, was justified and occasionally what Krause calls "the primary spasming centre" might be excised. (*iii.*) Those due to so-called idiopathic epilepsy, about which Sargent writes: "I have searched in vain . . . for any encouragement to pursue further the quest for an operative procedure which holds out any prospect for benefiting the sufferer from idiopathic epilepsy."

Congenital Word Blindness.

LUCY G. FILDES (*Brain*, Vol. XLIV., Part III., 1921) records a psychological inquiry into the condition commonly known by the misleading term congenital word blindness. She examined a series of cases side by side with controls and makes three points: (*i.*) Non-readers are found with all degrees of intelligence and the degree of failure in reading, at least among normal and defective individuals, shows little correlation with the degree of so-called "general defect," hence the defect underlying inability to read is to a certain degree specific in kind. The idea that deficiency in reading power is always an indication of a deficiency of a more general kind is not supported by the psychological facts. (*ii.*) The experiments do not support the existence of a "visual word" centre, the absence of or injury to which will make the visual recognition of words impossible. The word-blind individuals have difficulties in dealing with the material other than words. The theory that ability to read depends on the power to store up images of words has no psychological support; the recall of images is not in question. (*iii.*) The theory that the experiments do support is that "word blindness" is but one aspect of a more general, in itself specific defect in either the visual or auditory regions or in both—a reduction of the power to deal with forms visually presented and to discriminate or retain similar sounds. Whether there is also a failure to form memory images is not known. Since imagery depends on introspection, it is difficult to determine in defective children.

The Pathogenesis of Tabes Dorsalis.

W. J. ADIE (*Journal of Neurology and Psychopathology*, November, 1921), in a critical review of the pathogenesis of *tabes dorsalis*, quotes recent work of Richter describing a lesion which is primary, essential and constant and one which represents a direct and local reaction to the virus of syphilis. It is an inflammation of the nerve roots, which begins at that point above the sensory root ganglion where the dorsal and ventral spinal roots converge to form the radicular nerve of Nageotte. The lesion presents specific histological characters. The degenerations in the posterior columns are entirely secondary. Meningitis in the usual sense plays no part. Richter's views are based on a thorough examination of twenty-four patients, 10,000 preparations having been made and, if confirmed, will terminate age-long disputes and speculations. The findings go further than those of Nageotte (*périnévrite radiculaire*) and they upset the mechanical theory of Obersteiner and Redlich, who drew attention to the constriction of the posterior root where it pierces the *pia mater* and regarded this as a *locus minoris resistentiæ*. In the same way the meningitic theory and the theory of the elective systematic distribution of the degeneration, the so-called toxic-elective theory, both founded on surmise, must be abandoned.

The Pilomotor Reflex.

ANDRÉ THOMAS (*Revue Neurologique*, No. 11, 1920, and Nos. 9-10, 1921) describes the receptive field, appropriate stimuli and the characters of the response in the pilomotor reflex under various conditions. Normally the pilomotor muscles may be excited directly by mechanical stimuli or reflexly. As a reflex it may be obtained by sundry cutaneous stimuli, *e.g.*, cold, friction and the electric current. To stimuli on one side the response is homolateral and may extend to the whole of the stimulated half of the body or be restricted to one or more segmental areas. Certain parts are specially receptive, the nape of the neck, the shoulders and the lower part of the axilla. On the limbs, extensor are more receptive than flexor surfaces. In lesions of the spinal cord the response is exaggerated immediately below the upper level of the lesion. In total division of the cord, the reflex appears when spinal shock subsides, that is, simultaneously with the mass reflex, and it is elicited by the same stimuli as is the mass reflex, for instance, passive movements of the leg. Hence the governing factors in distribution are the same as those for reflex sweating, that is, the distribution of the thoracico-lumbar white rami. In partial lesions and in various diseases of the spinal cord, the responses vary and are difficult to interpret. In peripheral nerve lesions the reflex response is abolished over the area of sensory loss. The cerebral reflex, the name given to a response above the level of a lesion of the spinal cord, varies greatly in facility and distribution. It descends to the level of the sympathetic distribution of the isolated cord. In the normal subject the reflex may be obtained by peripheral stimuli and in various emotional states. In the case of the former means of excitation the sensations aroused are affective and unpleasant. Accordingly from anæsthetic skin no response is elicited. The emotions which produce the reflex are also of unpleasant quality. The most efficient stimuli are fright and horror, but any profound emotion suffices. The reflex stirred up by emotion is bilateral, that by peripheral irritation may be unilateral. The pilomotor reflex, therefore, may be looked upon as an affective reflex.

The Treatment of Multiple Sclerosis.

CHARLES METCALFE BYRNES (*Journal of the American Medical Association*, March 25, 1922) concludes that no organic disease of the central nervous system so closely resembles syphilis in its symptomatology and pathology as does multiple sclerosis. The cellular reactions are similar to those of syphilis and with the exception of the Bordet test, the spinal fluid shows changes comparable with those in the vascular and gummatous forms of cerebrospinal syphilis. Failure to demonstrate *Spirochæta pallida* or to secure a positive Bordet reaction in all cases is no proof that syphilis may not be an ætiological factor, nor is the therapeutic test of value as a diagnostic measure. Although syphilis may not be an ætiological factor, there are undoubtedly clinical forms of disseminated syphilis which are indistinguishable from insular sclerosis and until the ætiology of the latter disease is established or a more acceptable form of therapy devised, the use of antisyphilitic treatment is worthy of consideration. Treatment is more likely to be effective if begun in the early stages of the disease and both intravenous and intradural medication are recommended. Mercury and the iodides may also be prescribed with advantage. Five cases are reported, two of which were favourably treated in this way.

British Medical Association News.

SCIENTIFIC.

A MEETING of the South Australian Branch of the British Medical Association was held at the Lister Hall, Hindmarsh Square, Adelaide, on February 23, 1922. The chair was at first taken by the Vice-President, DR. T. G. WILSON, and later by the President, DR. BRONTE SMEATON.

Epithelioma of the Sternum.

DR. H. CAREW NOTT presented a patient, a married woman, aged forty-nine years, whose right breast had been removed five and a half years previously, four weeks after a lump had been noticed in the gland. Three years later the patient had suffered pains in the chest. An X-ray examination had been carried out. No abnormality had been discovered, either as a result of this or of a thorough clinical examination. One year later a lump had been noticed in the skin of the back and a dark, bruise-like patch had been seen in the skin covering the upper portion of the sternum. The tumour in the back had been regarded as a sebaceous cyst and had been removed. On histological examination it had proved to be carcinomatous. The sternal lesion had undergone ulceration. The patient had then sought the advice of Dr. A. M. Cudmore, who had recommended either the surgical excision of the upper portion of the sternum or treatment by X-rays. The patient had elected the latter course and had been referred to Dr. Nott.

On examination Dr. Nott had found an excoriated ulcer over the sternum, about the size of a sixpenny piece, with dark edges and a foul exudation. There was an open wound in the right lumbar region about 2.5 centimetres by five centimetres, where the carcinomatous recurrent growth had been removed. The patient had complained of great pain across the front of the chest. The pain had been very severe for two weeks and had prevented her from sleeping. X-ray tratment had been begun on March 16, 1921, on both lesions. By April 20, 1921, the wound in the back had healed and the pain was much less. On May 5, 1921, an acute septic dermatitis, spreading from the ulcer of the sternum, had appeared. This had cleared up by June 23, 1921. Healing of the ulcer had started in August and had been complete in November. The pain had been entirely relieved. On February 23, 1922, although the ulcer had remained healed, two suspicious nodules were seen in the neighbourhood. The patient was suffering no pain, but was losing weight. Dr. Nott presumed that a recurrence had obviously occurred in some situation.

Radiation and Malignant Disease.

DR. H. CAREW NOTT then read a paper on the treatment of malignant disease by radiation (see page 567).

DR. WILLIAM RAY said that he agreed with Dr. Nott in the greater number of his contentions. He advocated the inclusion in the medical curriculum of instruction in the use of X-rays. The majority of medical men were ignorant of the advantages of X-rays in the diagnosis and treatment of disease. The treatment certainly did good in certain conditions and if administered at the proper time he thought that X-rays probably retarded the growth of a malignant tumour and even prevented a recurrence. Success in radiation depended chiefly on the application of the proper dosage and a strict attention to details. He believed in using the maximum doses at the first application.

DR. C. DUGUID said that he would like to hear what Dr. Nott's experience had been in the treatment of cervical carcinoma by radiation. In 1907 the treatment had been almost entirely by the scalpel. In 1919 the scalpel had been used frequently in conjunction with radiation, with the result that fewer malignant growths were considered to be inoperable.

DR. NOTT, in reply, said that while in London he had seen patients with cervical carcinoma treated with 130 milligrammes of radium with good results. Howard Kelly had used 200 milligrammes. Radiation did not interfere with subsequent operation. Formerly the objection had been raised to the use of X-rays and radium that they led to an increase of fibrous tissue. If an operation were performed soon after the application of X-rays, this objection would no longer be valid.

DR. BRONTE SMEATON, the President, thanked Dr. Nott for his paper and expressed the opinion that the paper and the discussion would tend to the more extensive use of radio-therapy by the members of the Branch.

A MEETING of the Victorian Branch of the British Medical Association was held in conjunction with the Melbourne Hospital Clinical Society in the Hall of the Out-Patient Department, Melbourne Hospital, on April 5, 1921, DR. L. S. LATHAM, the Vice-President, in the chair.

Cirsoid Aneurysm.

MR. W. ALLAN HAILES presented a man in whom a pulsating tumour in the right temporal region raised the question of diagnosis between aneurysmal varix and cirsoid aneurysm. Mr. Hailes regarded is as an instance of the latter condition and in an outline of the patient's history stated that he had been wounded in September, 1916, and some months later had undergone an operation in England in 1917. The patient insisted that the existing pulsating tumour followed the operation and not the original wound.

A radiographic examination showed that there was at present no trace of injury to the bones of the skull; arteries from the temporal and frontal regions could be seen running into the tumour; the pulsating vessels could be felt, but there was no thrill and no *bruit*.

Aneurysm of Ascending Aorta.

DR. KONRAD HILLER demonstrated the clinical features in two patients, of whom the first was a man, aged fifty-eight. Eighteen months ago he had first noticed pain in the right infra-clavicular region and in the right axilla. The pain had been of a stabbing nature and had been accentuated by coughing and deep breathing. He had continued at his work until two months ago, when an unusually severe attack of pain had caused him to seek advice. It had been ascertained by inquiry that at no time had there been any dyspnœa or œdema of the legs.

On physical examination dilated venules were apparent in the left lower thoracic region and a visible pulsation over an area of 7.5 centimetres in diameter, with the centre just inside the nipple line in the third right interspace. The apex beat was located in the fifth intercostal space at a distance of 12.5 centimetres from the mid-line. A definite diastolic shock was noted in the area of expansile impulse in the third right interspace. By percussion was demonstrable an area of extensive dulness to the right of the sternum and auscultation disclosed a systolic *bruit* at the apex and an accentuated second sound in the aortic area. No diastolic murmur was audible.

The complement fixation test for hydatid had been applied, but no reaction had been obtained. The response of the patient's serum to the Wassermann test was recorded as "strong positive.' The radiographer's report was to the effect that a rounded mass, apparently continuous with the heart and above the level of the right auricle, extended laterally about five centimetres on the right side. It was pulsatile and suggested an aneurysm of the root of the ascending aorta.

Tuberculous Caries or Neoplasm.

DR. HILLER'S second patient was a young man who had sought treatment on account of progressive numbness and weakness in the right leg of four months' duration. The disability at times had improved, but on the whole it was becoming more serious. It was not definitely influenced by exercise. Impaired sensation could be demonstrated over an area corresponding to the peripheral distribution of the fourth and fifth lumbar segments and pathological changes in the lumbar portion of the vertebral column were revealed by X-ray examination. These were of the nature of apparently active absorption of the whole of the right side of the body of the fifth lumbar vertebra and of its right articular process; some absorption was evident in the lower half of the left side of the body of the same vertebra, while the upper portion on this side showed

sclerotic changes. This feature, together with the absence of collapse, was unlike a tuberculous process and the general picture was not that of a neoplasm.

Investigation of the electrical reactions of the muscles of the affected limb showed that there was a diminished excitability to faradism. To galvanism, eight milliampères, kathodal closing contraction was greater than the anodal closing contraction. The response was normal in intensity and character and there was no reaction of degeneration.

Dr. Hiller intimated that no response had been obtained to the serological tests, Wassermann and hydatid complement fixation tests and that he considered that the diagnosis lay between tuberculous caries and a neoplasm.

Polycystic Kidney.

DR. R. P. MCMEEKIN presented a woman, aged thirty-four, suffering from polycystic kidney who in December last had sought treatment at the Eye and Ear Hospital for defective vision. She was found to have a retinal hæmorrhage and was referred to the general hospital. It was found that her systolic blood pressure was 200 millimetres Hg. and the diastolic reading was 140 millimetres Hg.. The left kidney was grossly enlarged, hard, irregular and nodular and gave a strong impression of a cystic character on palpation. It was not tender and did not move unduly with respiration.

Dr. Maxwell had estimated the blood urea and found it to be 53 milligrammes per 100 cubic centimetres and the estimations of urea in the urine on application of the urea concentration test were 1.55% for the first hour and the same figure for the second hour. The urine contained many squamous epithelial cells; no other cellular elements, such as red blood cells or casts, were detected and cultures were sterile.

Pseudo-Hypertrophic Muscular Paralysis.

DR. MCMEEKIN also exhibited a boy, aged ten, the subject of pseudo-hypertrophic muscular paralysis. The "pseudo-hypertrophy" was well shown in the muscles of the calf and in the *quadriceps extensor* in the thigh. The boy exhibited lordosis, *talipes equino-varus*, a waddling gait and the classical method of rising from the supine to the erect position. His mentality was normal and no defect in sensation could be elicited. The electrical reactions of the hamstrings and of the muscles of the calf, shoulder girdle, arm and fingers showed no deviation from the normal responses. An interesting point about this boy was that there was no family history of muscular dystrophy.

Spinal Tumour.

MR. ALAN NEWTON detailed the history of a man upon whom he had operated for the removal of an extra-medullary spinal tumour. This patient had been presented at a meeting of the Melbourne Hospital Clinical Society by Dr. Sewell in November, 1920 (see THE MEDICAL JOURNAL OF AUSTRALIA, March 5, 1921, page 200), and operation followed immediately on that meeting.

For twelve months before coming under observation the patient had been the subject of pain in the left lower segment of the abdomen, radiating towards the mid-line, and had been for the latter part of this period under increasing disability in following his occupation. He had noted that in addition to difficulty in using his left leg he seemed to have lost knowledge of the position of the limb. At Dr. Sewell's first examination of the patient he considered that he presented a definite symptom-complex. The left posterior column did not seem to be conducting at all, as the sense of active and passive position was absent; there was no appreciation of gross vibrations and no discrimination of the distance between points. Sensibility to touch, pain and temperature in the left leg was good. At the level of the twelfth dorsal, first and second lumbar segments and confined to these segments gross analgesia was apparent; there was no hyperæsthesia. In these areas touch was appreciated if slight pressure were employed, but the epicritic sensibility was defective. In the opposite limb there was loss of sensation to pain in the peripheral distribution corresponding to the second, third and fourth sacral segments, with complete analgesia over the area of the first sacral segment. All the lumbar segmental areas on this side appeared not to be affected. Thus the only crossed fibres implicated were the sacral fibres in the opposite antero-lateral tract. That the motor tracts were definitely involved on the left side was apparent from the exaggeration of the deep reflexes and the presence of a definite extensor plantar reflex.

The features at this stage were therefore those of a Brown-Séquard syndrome with the lesion at the level of the first lumbar segment. At this time very slight rigidity of the spinal column was detected. The patient had experienced some difficulty in commencing the act of micturition. The patient's serum did not yield a reaction to the Wassermann test. Progress had been rapid. An examination made after the lapse of three weeks disclosed definite evidence of involvement of the tracts in the right side of the cord, as well as of those of the left side, in the shape of marked impairment of posterior columnar conduction and the extensor nature of the plantar response. The patient at this stage was affected with complete retention of urine. An examination of the cerebro-spinal fluid showed that, while there was no excess of cells, the globulin content was slightly raised. There was no response with the cerebro-spinal fluid to the Wassermann test.

Mr. Newton said that, in view of the rapid progression in the signs and symptoms and the definite localization of the lesion at the level of the first lumbar segment, he had decided to operate without delay. By a two-stage operation he had removed an extra-medullary tumour, adherent to the pia-arachnoid, which was subsequently reported pathologically to be an actively growing round-celled sarcoma. Fifteen months had elapsed since the operation and the man was now pursuing his occupation.

Diathermy.

MR. W. KENT HUGHES showed a number of patients in whom remarkably good results had been attained in the treatment of rodent ulcer and epithelioma by diathermy.

The first man, aged thirty-six, had been afflicted with a rodent ulcer measuring ten centimetres by eight centimetres, situated on the back of the neck, for a period of thirteen years. The first application of the diathermic cautery was made on April 7, 1921, a second on July 20, 1921, and a third on August 25, 1921. On the occasion of the third treatment a piece of tissue from the denuded area was sent for pathological examination and the report received was to the effect that there was no histological evidence of rodent ulcer. Healing had progressed slowly and up to the present time there had been no indication of a recurrence of the malignant process.

A man, aged seventy-eight years, was the subject of multiple foci of rodent ulceration, the history dating back six years. Diathermic treatment had been applied to an ulcer on the left cheek one year ago, as also to a second one on the left side of the neck. A third large ulcer in front of the right ear had been healed by radium and X-ray therapy, but had broken down at the end of last year.

In two other patients rodent ulcers of fourteen and fifteen years' duration respectively and each about the size of half a crown had been reduced in size and healing promoted by one application of diathermy in January, 1922.

Mr. Kent Hughes's last patient exhibited a very extensive and inoperable epithelioma of two years' standing. The malignant change had involved the palate, right fauces, tonsil, mandible and the upper right alveolar border adjacent to the fauces. The tongue opposite the fauces and for some distance towards its root was also involved. One year had elapsed since the first treatment by diathermy and six months since the second. The previously affected areas were now clean and free from ulceration and the spread of the epitheliomatous process had been arrested. The cervical glands in this patient had been removed by Mr. Zwar in February, 1921.

Myositis Ossificans.

MR. H. R. DEW, on behalf of MR. VICTOR HURLEY, C.M.G., presented an example of *myositis ossificans* and exhibited interesting skiagrams illustrative of the condition.

The patient, a man aged twenty-one, had sustained his original injury in May, 1920, when he had wrenched his left arm in an attempt to save a motor-cycle from falling. He stated quite definitely that the machine did not hit the elbow directly. On the following day he had noticed that

he could not lift heavy objects very well with his left arm, but took little account of the effects of the injury until one month later. He had then found that the movements of the elbow-joint were considerably limited, especially that of extension.

Skiagrams taken on two occasions at the end of June, 1920, had shown no discernible changes.

The condition first came under the notice of Mr. Hurley, who had made the diagnosis of *myositis ossificans traumatica* in July, 1920. At this stage a shadow in the *brachialis anterior* muscle had been apparent in the X-ray photograph. The treatment prescribed had been that the arm should be carried in a sling in a position of full flexion for three months.

In August, 1920, the patient had discarded the sling and had played a game of golf, with apparently little disability, but in September he had found that limitation of movement was becoming more pronounced. The range of movement of the elbow-joint progressively diminished until, by December, 1920, twenty months after the injury, it was reduced to 5°. A shadow as of a bony out-growth from the humerus had also been very evident in several skiagrams taken at intervals.

Operation was advised and subsequently performed. Post-operative measures comprised active and passive movement and exercise. The angle of movement had greatly increased, though tardily, and now appeared stationary.

Malignant Disease and Radiation.

DR. L. J. CLENDINNEN, as supplementing a paper recently read before the Branch, exhibited thirty-four examples of malignant disease, in all of which very beneficial results had followed on radium and Röntgen ray therapy.

The first patient was a man who had been referred to Dr. Clendinnen in April, 1918, on account of a proliferating, inoperable carcinoma of the anterior portion of the floor of the mouth. Following a course of radium treatment, enlarged glands had been excised from the right side of the neck in December, 1918. In May, 1919, it had been found necessary to excise a recurrent malignant deposit from the same situation and the second operation was supplemented by X-ray therapy.

Enlarged glands from the left side of the neck had been removed surgically in August, 1919, and a further course of irradiation had been administered to the floor of the mouth.

Treatment had then been suspended for one year, at the end of which time it had been considered advisable to resume radio-therapy to the mouth on account of a slightly suspicious thickening in the scar. At the time of the meeting the patient was free from any indication of existing malignant disease and he had had no treatment for one year and eight months.

The results to be attained by radium and X-ray therapy in the treatment of epithelioma of the lip were demonstrated in a series of patients. In a man aged forty a crateriform growth had been present for two years, with implication of a large sub-mental gland when treatment was commenced. In this instance no surgical measures had been taken and the patient, whose last treatment was two and a half years ago, had apparently been cured.

Three patients were exhibited in whom inoperable carcinoma of the lip and mucous membrane of the cheek had apparently been cured by radio-therapy, the interval of freedom from recurrence ranging from eighteen months to four years. The successful application of irradiation to recurrent growths in the scar after surgical removal of epitheliomatous cervical glands was illustrated in two patients who had remained apparently cured for four and two years respectively.

Other instances of malignant disease of the skin were furnished by two men formerly afflicted with rodent ulceration of the nose involving the nasal cartilages; healing had followed treatment by radium and no further treatment had been necessary for periods of one and a half and three and three-quarter years respectivly. A patient with a recurrent epithelioma of the forehead, complicated by fixity of the growth to the frontal bone, had remained apparently cured for over four years.

Dr. Clendinnen further exhibited a parotid tumour which had been reduced to one-third of its former size by irradiation; all indications of activity had been arrested for over twelve months. In a patient who had recently come under treatment, a recurrent endothelioma of the cheek, with pre-auricular, submental and cervical glands involved, had completely disappeared under radio-therapy.

The response of a rapidly growing lymphoma of the left cheek and a later deposit in the tissues of the right neck to irradiation was illustrated by a patient who had been relieved of the former growth for a period of over twelve months and of the latter, a more recent condition, for three months.

A sarcomatous growth of the lingual tonsil had recurred in the anterior pharyngeal wall and neighbouring tissues after radical operation and had been pronounced hopeless. Although treatment in this instance had been too recent to speak confidently of the ultimate result, under radium therapy there had been a complete disappearance of the growth and of symptoms.

Post-operative radiation had maintained another patient free from a malignant lympho-sarcoma in the sub-maxillary region for twelve months. Irradiation had been instituted after the second recurrence of the growth following operative attempts to extirpate it.

The scope for radio-therapy in Hodgkin's disease was shown in two patients in whom there had been induced a disappearance of the enlarged glands and an apparent general well-being for over three years.

In another instance a large mediastinal growth, with involvement of neck glands and severe general symptoms, a recession of the growths and disappearance of symptoms had followed irradiation and this patient had been apparently well for nine months.

Dr. Clendinnen next demonstrated a number of examples of carcinoma of the breast and the results attendant on radio-therapy in this condition.

A woman in whom a carcinoma of the breast implicating the skin and axillary glands had been pronounced unsuitable for operation, had been given the benefit of radio-therapy and had remained apparently cured for upwards of six years.

Paget's disease of the nipple, which had existed for fifteen months, had remained apparently cured for eight months. In a recurrent carcinoma of the breast, with ulceration involving the costal cartilages, an apparent cure had been maintained for two years and eleven months.

Two women were presented in whom post-operative irradiation had been instituted in carcinoma of the breast; in neither was there any evidence of recurrence after two and a half and three years respectively.

Dr. Clendinnen concluded with an outline of the history of a woman with a fungating carcinoma of the cervix and body of the uterus. The patient had been referred to him in February, 1920, and under pre-operative irradiation there ensued a retraction and disappearance of the growth. Hysterectomy had been performed six months later and had been followed by prophylactic radium treatment. The patient had received no treatment for one year and seven months, was now well and had gained nineteen kilograms in weight.

NOTICES.

THE COUNCIL OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION has arranged the following provisional programme of the Branch. The Scientific Committee reserves to itself the right to modify the arrangements, but it is hoped that no changes will be necessary.

June 7, 1922.

At the Walter and Eliza Hall Institute, Melbourne Hospital, at 8.15 p.m..

DR. W. J. PENFOLD will demonstrate the action of pneumococci on aromatic amino bodies.

DR. W. J. PENFOLD: "Australian Pneumococci."

DR. S. W. PATTERSON: (*a*) "Prognosis in Pneumonia"; (*b*) "Clinical Application of Serum Treatment of Pneumonia."

DR. R. L. FORSYTH will open the discussion on the serum treatment of pneumonia from clinical experience at the Children's Hospital. Papers will be illustrated by lantern slides.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

ANDREW, JAMES MOORE, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

ASHKENASY, MARK, M.B., B.S., 1922 (Univ. Melbourne), Alfred Hospital.

BARNETT, TREVOR SAMUEL MONTAGUE, M.B., B.S., 1922 (Univ. Melbourne), Balaclava Road, Caulfield.

BRYCE, LUCY MEREDITH, M.B., B.S., 1922 (Univ. Melbourne), 22, Victoria Avenue, Canterbury.

BURNET, FRANK MACFARLANE, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

BYRNE, JOHN EDWARD, M.B., B.S., 1922 (Univ. Melbourne), 308, Dandenong Road, East St. Kilda.

CAMERON, GORDON ROY, M.B., B.S., 1922 (Univ. Melbourne), 45, Blessington Street, St. Kilda.

CAMERON, IAN THOMAS, M.B., B.S., 1922 (Univ. Melbourne), Infectious Hospital, Fairfield.

CLARK, ALEXANDRA MARGARET ANNIE, M.B., B.S., 1922 (Univ. Melbourne), Burwood Road, Hawthorn.

CLARK, FREDERICK JOHN, M.B., B.S., 1922 (Univ. Melbourne), Burwood Road, Burwood.

COOK, CYRIL EDMUND, M.B., B.S., 1922 (Univ. Melbourne), 2, Studley Park Road, Kew.

COOK, WILLIAM STANLEY, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

CORKILL, ARTHUR BASIL, M.B., B.S., 1922 (Univ. Melbourne), Alfred Hospital.

DRAKE, FRANCIS JAMES BAIN, M.B., B.S., 1922 (Univ. Melbourne), 20, Nelson Street, Mont Albert.

DUNCOMBE, CEDRIC, M.B., B.S., 1922 (Univ. Melbourne), 41, Walsh Street, South Yarra.

GRIFFITHS, WILLIAM RAYMOND DUDLEY, M.B., B.S., 1922 (Univ. Melbourne), Albert Street, Sebastopol.

HALL, REGINALD DALTON MCKELLAR, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

HAWKINS, HENRY RUPERT, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

HEWITSON, MAGGIE, M.B., B.S., 1922 (Univ. Melbourne), 47, Victoria Street, Williamstown.

HOME, ARTHUR ROBINSON, M.B., B.S., 1922 (Univ. Melbourne), Main Street, Elsternwick.

HUMPHREY, MARY JOURNEAUX, M.B., B.S., 1922 (Univ. Melbourne), Grandview Grove, Armadale.

LEMMON, WILLIAM MORTON, M.B., B.S., 1922 (Univ. Melbourne), Geelong Hospital.

LENNON, LAURENCE REUBEN, M.B., B.S., 1922 (Univ. Melbourne), St. Vincent's Hospital.

LITTLEJOHN, JEAN, M.B., B.S., 1922 (Univ. Melbourne) Scotch College, Melbourne.

MACKAY, KATE, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

MACNAMARA, ANNIE JEAN, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

MALLALIEU, CLIFFORD SCHOFIELD, M.B., B.S., 1922 (Univ. Melbourne), Victoria Street, Footscray.

MCCOWAN, DOUGLAS DUNCAN, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

MCKENZIE, STANLEY ARNOLD, M.B., B.S., 1922 (Univ. Melbourne), 1, Blyth Street, Brunswick.

MCRAE, STEWART CLIFTON JOHN, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

PENNINGTON, GEOFFREY ALFRED, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

PHIPPS, KATHLEEN ELIZABETH, M.B., B.S., 1922 (Univ. Melbourne), St. Vincent's Hospital.

RAWSON, OBY WILLARS, M.B., B.S., 1922 (Univ. Melbourne), Melbourne Hospital.

REUTON, DOUGLAS GEORGE, M.B., B.S., 1922 (Univ. Melbourne), Alfred Hospital, Prahran.

SIMPSON, GEORGE, M.B., B.S., 1922 (Univ. Melbourne) Melbourne Hospital.

STEWART, DONALD GEDDES, M.B., B.S., 1922 (Univ. Melbourne), Kyneton Hospital.

TROUP, GILBERT REYNOLDS, M.B., B.S., 1922 (Univ. Melbourne), 39, Grandview Grove, Armadale.

WILLIAMS, CLIVE GOWAN, M.B., B.S., 1922 (Univ. Melbourne), 22, Mason Street, Hawthorn.

WILLIS, RUPERT ALLAN, M.B., B.S., 1922 (Univ. Melbourne), Alfred Hospital.

THE undermentioned has been nominated for election as a member of the New South Wales Branch of the British Medical Association:

DICKSON, JOSEPH SYDNEY, L.R.C.P., L.R.C.S. (Edin.), L.R.F.P.S. (Glasg.), 1915, 61, Raglan Street, Mosman.

University Intelligence.

THE UNIVERSITY OF SYDNEY.

A MEETING of the Senate of the University of Sydney was held on May 8, 1922.

The following recommendation of the Public Exhibitions Committee was adopted: "That the University By-Laws, Chapter XXV., Section 7, be amended so as to allow the Diploma in Education to be taken by Public Exhibitioners after they have graduated in Arts or Science."

It was also decided to amend the By-Law with reference to the examination for the degree of Doctor of Science, so that this examination may be held once in each term instead of once a year as at present.

The following appointments were made:

MR. W. A. SELLE, B.A., as Assistant Registrar and MR. G. DALE, B.Sc., as Clerk of Examinations, *vice* Mr. Selle.

MISS LENA M. BATES, B.A., as Assistant in the Fisher Library.

DR. H. J. CLAYTON as Tutor in Medicine at the Royal Prince Alfred Hospital, *vice* DR. J. I. C. COSH (resigned).

MR. N. A. ESSERMAN, B.Sc., as Lecturer and Demonstrator in the Department of Physics for a period of twelve months during MR. MACKAY'S absence from the position as Student Adviser.

MR. E. C. GATES to be Lecturer in Clinical Dentistry and Orthodontia, *vice* DR. A. L. LYELL (resigned).

DR. R. H. TODD as Lecturer in Medical Ethics for the current year.

In connexion with the vacant Chair of Zoology, it was decided that the position be advertised.

Correspondence.

WARMED ETHER.

SIR: My work on heat loss during operations under ether anæsthesia seems to have upset the equilibrium of several people very much indeed, apparently on account of real or supposed insults offered to theories now proved false, but which they had come to number amongst their gods.

Take, for instance, my very latest critic, Dr. Moss. I can excuse his little inaugural "blow-off" about high horses, which hurts nobody. I recognize it as his starting whistle. Not so, however, with what follows. Dr. Moss is good enough to inform us all, and to say it twice, that "facts are stubborn things" and the innocent reader might on that suppose that my critic is a sort of person who is scrupulous about his statements, whose representations can be trusted and whose "facts" are facts.

When a man presumes to discuss an important subject in your columns, he is not entitled to behave as an irresponsible being and he owes some respect to your readers. Therefore, his next statement, which is a false one, is not one that can be excused. Here is the false statement: "He insists that the delivery of warmed dried anæsthetic vapours is more harmful than otherwise to the patient, the dehydration being depressing." Now, I say that this is wholly, all of it, false. I said it neither directly, in form, nor indirectly, by implication, by suggestions or in effect. From beginning to end it is a fabrication, both as to word and as to idea and Dr. Moss has been given no handle on which to support his fabrication. The only good purpose it serves is to help to reveal the sort of man who is Dr. Moss—an inaccurate observer, an inaccurate thinker and

a sloppily inaccurate and reckless writer. Dr. Moss does not know my opinions, nor do your readers—and I am sure they can very well afford to do without them. Yet I am alleged to "insist" the stuff.

It had nothing to do with my subject whether this or that amount of heat loss would be harmful to a patient or not. That was another subject and another question, one on which readers could have any opinion they liked so far as I was concerned. Instead of magnifying the importance in any respect of an alteration in the temperature or in the hygrometric condition of the inspired air, I minimized it—as I believed I was entitled to do—in these words (page 118): "The proportion of total body loss to be saved by shutting the gate of the respiratory channel of loss is relatively small"; and then I went on to say: "Nevertheless, it is conceivable that there may be a special pathological importance in the local loss produced by cooling of the respiratory mucous membrane. . . . Whether this be so or not I do not know and do not propose to discuss here."

I accept responsibility for my own statements, but your readers will see that Dr. Moss has invented statements and pretended that they are mine. However, in describing these as false, I use the term not as implying any intention to deceive, for I think the probable explanation is reckless want of care. He has not an accurate, intellectual apprehension of the document he is trying to criticize and he has deceived himself as much as anyone else, perhaps more. But it is a bad beginning.

His very next sentence supplies an instance of his sloppiness. "I have read his articles and tried to find the flaw in his reasoning, for these must be a flaw when clinical results are so contradictory to laboratory experiments." What laboratory experiments? The only experiments in which Dr. Wardlaw and I were involved were carried out on actual patients under anæsthesia while being operated on. The operating theatre may be described as a laboratory, but not in contra-distinction to his own arena of work, and the "laboratory experiments" were meticulously careful clinical observations, measurements, not guesses, not general impressions. Is not the "flaw" of which Dr. Moss speaks, if there is any flaw, much more likely to be in the guesses and general impressions which Dr. Moss confuses with and dignifies as his "clinical results". Why should the provedly inaccurate Dr. Moss be so cock-sure that his own impressions are necessarily flawless and our own observations and results, as careful and exact as we could make them, the ones that must be fallacious? Which is the party riding on the high horse?

Dr. Moss then goes on to reproduce a short-visioned fallacy that has already been dealt with by me in replying to Dr. Dyring. It is that the patient economizes heat loss by re-breathing his own exhaled water-vapour. Since Professor Pembrey and Dr. Shipway fell independently into the same pitfall, this is the third time it has paraded as an argument and it is now perhaps allowable to repeat my answer.

The problem is the quantity of heat loss necessarily involved by the respiration of one cubic metre (1,000 litres) of air, measured as expired air at 33° C. and at standard barometric pressure. Let us suppose that we have at hand a satisfactory apparatus and proceed to receive the expired air into a calibrated gasometer, so that when an indicator reaches a certain mark we have collected exactly 1,000 litres. When we have collected it, the gasometer contains and must contain without asking Dr. Moss's or anyone's permission exactly 1,096.7 grammes of dry air and exactly 35.3 grammes of water-vapour, no matter what the temperature and hygrometric condition of the inspired air. Let us take the case of a man inspiring air at 0° C. and saturated for that temperature, since absolutely dry air is never breathed. At the end of the experiment the gasometer will contain 1,096.7 grammes of dry air, *plus* 4.4 grammes of water-vapour inhaled with the atmospheric air, *plus* another 30.9 grammes of water-vapour. The total water-vapour present, as above stated, must be 35.3 grammes. Where did that other 30.9 grammes of water-vapour come from? The reply must be that the only possible source was the body of the patient. And where did the latent heat of vapourization for that 30.9 grammes come from? Again, the only possible source was the body heat of the patient. It will be seen that it cannot matter one scrap whether the patient re-breathed the expired air in the mask or re-breathed backwards and forwards into the gasometer itself. Ré-breathing merely makes a tidal reflux during the process of accumulation, but until the indicator shows 1,000 litres, the 1,096.7 grammes of dry air have not been collected and when that is reached it is impossible not to have the 35.3 grammes of water-vapour also. These are inescapable physical facts which all the king's horses and all the king's men cannot alter. There is a University in Perth. If Dr. Moss cannot understand how these things have to be, let him go to the professor of physics in his own town for an explanation. What is the use of fighting with shut eyes against physical facts? Surely what our profession wants in these matters is the whole and unmixed truth.

Yours, etc.,

C. E. CORLETTE.

April 28, 1922.

RESEARCH IN TROPICAL AUSTRALIA.

SIR: No one will quarrel with the general trend of Dr. Maplestone's letter in your issue of April 29. That the control of the Tropical Institute should be by that of a Director responsible only to the Minister may seem a self-evident fact, but is not apparently obvious to those who hold the reins of political power in Melbourne. Nothing is more maddening (and I speak with the feeling that is born of knowledge) than the officious meddling of "superior authority" which is not conversant with the nature of the work to be done.

Research work must be as far as possible untrammelled. If a man is good enough for his job, he should be let do it his own way. If he makes a mess of it, sack him; but do not let him be harried and worried by red tape, pin pricks from theoretical "overlords."

Under the lay control of a Minister, which control would be chiefly financial, it should be possible to appoint the right type of man, who would be responsible for the whole work of the Institute and who should, as suggested by your correspondent, choose his own staff and the nature of the work done.

Dr. Maplestone is, however, to my way of thinking, over gloomy about the possibilities of such an institute and if I read him correctly, seems to convey the impression that because northern Australia is not yet heavily stocked with tropical disease, it is scarcely worth bothering about investigating into human tropical disorder at all.

The research worker is the actual cause of the research. Where the keen worker is, will the field be found. To my mind, at any rate, there are in Townsville and surroundings alone boundless possibilities for research, each pregnant with benefit for the future northlanders.

The bio-chemical problems associated with labour in such occupations as cane-cutting alone would occupy a skilled staff for years and would scarcely fail to produce results of value to the world. We have in Sydney to-day one of our own science graduates who could be turned loose on such problems with immense advantage to the future of industry in the tropics and elsewhere.

Other general ideas come rapidly enough into one's mind—research into the effect of sunlight, especially in relation to dermal conditions and cancer; problems of clothing, food and sleep times.

Then, again, the question of filaria is a giant matter crying aloud for patient inquiry. The rat question and the matter of other animal reservoirs for plague is now rather an obvious avenue for work. Leprosy lurks here and there all over Queensland; is this not alone worth investigation? The reason for its curious local incidence in certain spots is a fascinating problem.

Although dengue is irregular in its epidemic occurrences, small outbreaks occur from time to time and as Cleland and I have shown, the virus may be kept alive and so investigated for a considerable period. In view of the close resemblance of dengue and yellow fever in symptomatology and mode of spread by the *Stegomyia* mosquito, work along Noguchi's lines would probably show up the causal organism in one of its stages. The repeating of our mosquito work with cage-hatched mosquitoes and the

investigation of the life history of the parasite in the insect are other fields for work.

These examples are just at random; there are numerous others. Put the right man on the job in Townsville and let him alone and the Institute will soon justify its existence.

Yours, etc.,

BURTON BRADLEY.

Sydney, May 5, 1922.

THE COUNTRY HOSPITAL.

SIR: Your leading article, "The Country Hospital," will have been read with approval by the great majority of country practitioners. It must be welcome news to all that at last "an attempt will be made to devise some method of restricting the power of antagonism and arbitrary interference between the country hospital medical officer and his patients by autocratic committees."

From personal experience in Queensland I "could a tale unfold," but it needs no illustration of mine to point the necessity of such action; it has long been so well known that it is remarkable the problem has not been attacked long since.

There are, however, certain disabilities under which the country practitioner labours by reason of maladministration of and thoughtless arrangements made with country hospitals and their committees.

In Gin Gin, Queensland, I earned a reputation for charging high fees for major operations by reason of comparisons drawn with the scale of charges at Bundaberg General Hospital. That hospital had an agreement with the local friendly societies under which, in return for certain small annual subscriptions, the lodge members received hospital attention free of charge to themselves, but at the expense of the fund formed by their subscriptions. Major operations were all charged ten pounds or guineas. A statement of how the fund stood was rendered the societies annually and with their debit or credit to guide them, the new year's "call" was arrived at. The fee charged at Bundaberg was paid not to the medical officer, but to the general revenue of the hospital.

I, the medical officer of Gin Gin Cottage Hospital, with a small salary, right of private practice and right to charge for surgical work in hospital when the patient could afford to pay, was expected to charge the same absurdly small fees for major operations. I understand my experience is not unique and, beyond the disability under which such a practice places medical men within the sphere of influence of such pacts as these, it is repugnant that any hospital committee should be allowed to charge fees for services rendered by the medical officer and by so doing place their officer in competition with his colleagues in the district as a cheap labourer.

At Bullahdelah, in New South Wales, I labour under a disability far commoner. At Newcastle, Dungog and Maitland are general hospitals. Too commonly, cases needing major surgical assistance go to one or other of those hospitals, because they can get attention there for next to nothing. In one or two cases a little note to a colleague has forestalled them, but in the majority of cases I am powerless to prevent people who can well afford to pay, obtaining the gratuitous services of one or other of my colleagues in the larger town.

Yours, etc.,

H. LEIGHTON KESTEVAN.

Bullahdelah, New South Wales,
May 6, 1922.

EUPHORBIA PILULISERA AND ALLIED AUSTRALIAN SPECIES.

SIR: As supplementary to the report of the Analytical Department on a preparation containing *Euphorbia pilulifera*, published in your issue of April 22, the following notes may be of interest. *Euphorbia pilulifera* (Linn.) is a common herbaceous tropical weed indigenous to Tropical America, India, Northern Australia, Queensland, New Guinea, New Hebrides, Fiji Islands, etc.. It is easily cultivated. It is popularly termed "cat's hair," "snake weed" or "Queensland asthma herb." For medicinal use the herb is collected when in flower and carefully dried. It is said that alcohol fails to extract the medicinal properties as efficiently as water. Perhaps the active principle is unstable and only found with certainty in fresh specimens. John Lunn in 1909 found that the green plant consisted of 79% by weight of water, 18% of vegetable matter and 3% of ash. The dried plant yielded an alkaloid (one part in 1,000) and a glucoside (four parts per 1,000).

Many preparations have been in use. *Tinctura euphorbiæ pilulifera* (British Pharmacopœia Codex, 1894) was made from euphorbia, in No. 20 powder, 4; proof spirit (to percolate), 20; dose, 10 to 30 minims (0.6 mil to 2 mils). Other preparations of the leaves have been a decoction, fluid extract and dry extract. It has also been incorporated in anti-asthmatic tablets. The smoke of the dried herb has also been inhaled by means of an ordinary tobacco pipe or by burning on a slab. It has been recommended that the smoke be inhaled well into the lungs.

Matheson states that the drug is tonic and anti-spasmodic. Other observers say that it acts directly and solely on the cardiac and respiratory centres.

A. Marssets (*Therapeutic Gazette*, 1885) in his experiments on animals found initial quickening, then retardation of pulse and respiration. As untoward effects, nausea and gastric pain, probably the result of acrid constituents, have been noted. Duncan Turner (Intercolonial Medical Congress of Australasia, Third Session, 1892) says that this is a powerful remedy, but one to be carefully watched on account of its proneness to cause unpleasant, distressing and even alarming sensations in the region of the præcordia. In my own use of the drug I have not observed any unfavourable symptoms.

The therapeutic indications are said to be: The relief of cough, paroxysmal dyspnœa, all bronchial affections and disorders of the respiratory tract and all affections of the vagus. In detail, coryza, hay fever, laryngeal spasm, bronchial or spasmodic asthma, bronchitis, emphysema, pertussis, the distressing cough of phthisis and *angina pectoris*. Amongst the first to use it was Dr. Carr Boyd, of Queensland, who introduced it to notice about 1880 for asthma, bronchitis and other diseases of the respiratory organs. About 1883 it began to be used in the United States of America. Baker (1884) and Wragge testified to its efficacy, the latter ascribing almost magical effects in asthma. Tison, in eleven cases of dyspnœa, with or without bronchitis or emphysema, reported benefit in all. He regarded the nervous element as the one mainly affected. Sir Ferdinand von Mueller, M.D., of Victoria, thought that it would be found to possess useful curative properties. Dr. T. S. Dixson considered it to be of but little value. Some years ago I tried it frequently for asthma, bronchitis and emphysema and found it of no benefit except in one case of asthma. It is certainly not a specific for asthma, but apparently in some cases appears to give temporary relief. The book entitled "Useful Drugs," prepared under the direction and supervision of the Council on Pharmacy and Chemistry of the American Medical Association, does not mention it. If it possesses any useful properties, they are very insignificant.

Euphorbia alsinæflora (Baill.) is a native of Northern Australia. An infusion of this herb is used by bushmen for chronic dysentery and "low fever."

Euphorbia drummondii (Boiss.) is another Australian native plant, occurring throughout the States. It is called "caustic creeper" or "milk plant." In 1887 an anæsthetic alkaloid termed "drumine" was stated to have been extracted in Australia from this plant. It was said to have the same local action as cocaine. The so-called alkaloid, on examination in England, was found to consist mainly of calcium oxalate. Even the existence of the alkaloid is doubted. This plant is well known as a reputed poisoner of stock and is said to be very fatal to sheep and cattle under certain conditions which are not yet completely understood. Medicinally, remarkable curative effects have been claimed for it in cases of "low fever" and chronic dysentery in the human species. In western New South Wales the aborigines use an infusion or decoction in considerable doses for genital disorders. An overdose merely causes a headache.

As regards other species of *Euphorbia* in Australia, Dr. W. E. Roth records the use of one by the native tribes of

Central Queensland for difficult or painful micturition. The aborigines of the Northern Territory use the juice of a species for small-pox, the juice of another species being employed as a remedy for cancer. Another species it is said is eaten by the monitor or lace lizard—the "goanna" of the bush (*Varanus varius*)—after a battle with a venous snake to counteract the effects of the venom. Doubtless it is quite useless in averting a fatal termination to snake-bite.

Yours, etc.,

JOHN MACPHERSON,
Lecturer on Therapeutics and Materia Medica,
University of Sydney.

"Wyoming," Macquarie Street,
Sydney, May 6, 1922.

SOME ASPECTS OF INSANITY.

SIR: Referring to Dr. McDonald's paper on the above subject appearing in your issue of April 15, I beg to offer a short comment on the subject of hallucinations and the ease with which experienced mental specialists may be deceived by patients suffering from hallucinations, who are cunning and silent regarding their deviation.

The following example may be of interest: M.S., aged thirty-eight years, single, female, was ill-tempered and very quarrelsome without apparent cause. One night she set fire to the bedroom curtains and came near destroying the house. I was asked by the mother to examine her mental condition and experienced difficulty in forming an opinion to justify commitment to a mental hospital. The patient explained the burning of the lace curtains on the bedroom window as purely accidental, stating that she took a lighted candle to look out of the window at night and the curtain blew over the candle and ignited, but when pressed as to why she took the candle to look out of the window, explained she was searching for people in the lane or right of way who were making faces and pointing fingers at her. When I asked where these people were, she said they are up in the roof during day-time and "they are speaking to me now." This, in my opinion, was sufficient to justify a certificate of insanity and this was concurred in by my friend, Dr. F——. She was committed to Kew Asylum and admitted.

The Lunacy Statute provides that after seven days of detention the medical superintendent shall see and examine the patient and satisfy himself of insanity or otherwise. The medical superintendent, a gentlemen of long experience, telephoned to me, saying he felt obliged to discharge this patient as he could discover no hallucination or mental disorder, but before doing so he would like to see me, as the consequence might be unpleasant to me. I visited the asylum and spoke to the patient in presence of the superintendent. She was very vicious and threatened me with legal proceedings for wrongful detention. I asked to see the original certificates and questioned her as to her statement to me regarding people in the lane and in the roof of the house. She at once admitted that all that to be true and said I sent them there to annoy her. The superintendent at once ordered ber back to her ward and expressed regret that he was unable to elicit the mental state referred. Dr. F——, my colleague in this case, was greatly distressed, fearing some action by the patient, but I assured him that we were both convinced and certain of our position, notwithstanding the difference of opinion at the asylum. This case, I think, illustrates the risk of dealing with a crafty patient who masks or conceals delusions and hallucinations.

Yours, etc.,

J. DE B. GRIFFITH, M.D.

Somerville, Victoria.
(Undated.)

THE PHYSICS OF X-RAYS AND RADIUM.

SIR: An article by Dr. L. J. Clendinnen in THE MEDICAL JOURNAL OF AUSTRALIA of April 29, 1922, contained some statements on the physics of radium and X-rays so fundamentally wrong that I feel they should not be allowed to pass uncontradicted.

As a basis of criticism, it might be well to re-state as briefly as possible the conceptions of these matters in the light of modern physical research. In its simplest form the theory may be presented as follows:

(1) X-rays consist of electro-magnetic vibrations of the ether. They are of the same nature as the long Hertzian waves used in wireless telegraphy, those of radiant heat (infra-red), ordinary light (red to violet)—a single octave and the only portion of the series for which we possess a special receptive sense-organ—ultra-violet light and the γ rays of radium. These occur in an ascending scale (of vibration-frequency) and differ amongst themselves in their physical nature only as regards their wave-lengths and vibration-frequencies. These wave-lengths vary from about 20,000 metres (from "crest" to "crest") in the case of the longest Hertzian waves to a minute fraction of an Ångstrom unit (one ten-millionth of a millimetre) for the γ radiation of radium, covering in all a range of over fifty octaves. X-rays occupy a position between the ultra-violet and the γ rays. The shortest X-rays overlap the longest γ rays and the two are identical.

(2) Matter is made up of atoms, the latter each consisting of a comparatively stable system of negative particles (electrons) circulating with high velocity about a positive nucleus.

(3) Under certain conditions these atoms can be partially broken up, liberating one or more electrons. This occurs spontaneously in radium and the allied substances. It can be brought about also by heat (thermionic emission) and in other ways. In radium these liberated particles of negative electricity are thrown off with a very high velocity and form the β radiation. The projected positively-charged residual nuclei of the disrupted atoms constitute the α radiation.

(4) X-rays are generated whenever an electron suddenly alters it momentum, in particular whenever it is suddenly started or stopped.

(5) In radium the production of X-rays (or γ rays, as they are here called) is due probably to sudden changes in the atoms caused by the falling in of an electron from an outer to an inner orbit and also probably to the ejection of an electron from the atom.

(6) In the modern X-ray tube (*e.g.*, the Coolidge type) negative electrons are liberated from a heated spiral cathode (thermionic emission). They are driven across the gap between cathode and anode with a high acceleration (depending on the impressed voltage). The acquired momentum is suddenly destroyed by impaction on the anode and at the impact of each electron a pulse of X-rays is produced.

The vibration-frequency (and inversely the wave-length) of this pulse varies with the rate of destruction of momentum, *i.e.*, with the momentum acquired by the electron in being driven from cathode to anode. This in turn depends on the magnitude of the impressed voltage. Hence, the greater the voltage, other things being equal, the shorter the wave-lengths of and the more penetrating the X-rays produced.

(7) Thus the X-ray tube generates X-rays by the sudden destruction of gradually produced electronic momentum, radium by the sudden production or change of such momentum.

(8) The following propositions therefore become evident:

(*a*) X-rays and the γ radiations of radium are essentially the same.

(*b*) There is nothing in common between X-rays and γ rays on the one hand and the α and β radiations of radium on the other.

The first two are electro-magnetic vibrations of the ether of the same nature as ordinary light and having a frequency and a wave length. The latter two are streams of discrete particles, the one positively, the other negatively, charged. They obviously have neither frequency nor wave length, only velocity and direction and are in no way comparable with γ radiation.

To turn now to Dr. Clendinnen's paper:

In the first column (page 456), he states that: "The β rays . . . vary, as do X-rays, in their wave length and so in their penetrative power, which is inversely proportional to their wave length. They consist of negative electrons projected with a velocity of the same order as light waves, but with a considerably smaller wave length."

This highly erroneous statement is repeated in a different form in the following paragraph (page 457), under the heading of "X-rays," where the writer goes on to say that "the soft (X-) rays are very analagous in wave-length and tissue action to the radium β rays, while the harder rays approach the penetration of γ rays." . . .

These two mis-statements show an extraordinary confusion of ideas. As just stated, β rays have no wave formation and so, of course, no such thing as a wave-length. Therefore, they obviously cannot "vary in their wave-length" nor can their "penetrative power" be inversely proportional to their wave-length." Nor are they "analagous" to X-rays, "soft" or otherwise, and certainly not "in wave-length," as they have none. They represent an entirely different phenomenon.

In view of the increasing use of X-rays and especially of the recent introduction of "hard" X-radiation generated by enormous impressed voltages, it seems imperative that there should be a clear conception and intimate knowledge of the underlying physics of the matter. Such a basic knowledge is clearly absent in the article referred to and if the statements to which attention has been drawn, were allowed to pass uncorrected, they would serve only to mystify your readers and to implant false conceptions in the minds of those who have not studied the physics of X-rays and radium. I trust the importance of the subject will excuse the length at which I have dealt with it.

Yours, etc.,

K. STUART CROSS.

Melbourne, May 7, 1922.

PREVENTIVE MEDICINE IN MENTAL DISEASE.

SIR: Dr. Lind's excellent article in your issue of April 15, 1922, deals with an important branch of preventive medicine. His concluding remarks in regard to the descendants of the Jukes family is in itself some justification for the practice "in vogue in one at least of the American States" in regard to operation to produce sterility and, although he has taken up a humane position in regard to this matter, would it not be better for both the individual affected and the State if the intellectually deficient persons, the high-grade imbeciles and those who have recovered from an attack of insanity were prevented, as far as possible, from continuing their race? This prevention will not be carried out by giving proper advice to the mentally weak as to the most suitable methods of preventing conception, as their general moral and mental weakness renders them unfit to withstand temptation. I was led to understand in conversation some years ago with one of the heads of a large institution in Great Britain for the reception and care of youthful imbeciles and mentally deficient children that some of the female children of fair intelligence were passed on to civil life when they were considered old enough and able to provide for themselves, but that these girls were very frequently mothers of illegitimate children within a year or two of their active contact with civilization (?), thus adding to the number of defectives in the country and to the expenses of maintenance of this class of individual.

It is recognized that the half-caste is generally the child of the white father and the black mother and may we not therefore infer that the offspring of a normal parent and mentally defective one would probably be born by the defective mother, as the normal mother would invariably select a normal partner to be the father of her child. This may be largely the contributing cause of the "affinity between these psychopathic individuals who mate and produce an intensification of the vulnerability in their progeny."

This affinity may give the remedy for the eradication of the mentally unfit, as the sterilization of the female defective, without interfering with her sex, would go far in preventing the production of the unfit.

In Australia the male population exceeds the female, especially in the country districts, and this deficiency is also a contributing factor for the production of offspring by the slightly mentally deficient female, rather than by the deficient male, who would be avoided by the normal woman.

Prevention might be carried out after a consultation with a specialist in mental diseases by advising the parents of the necessity for the removal of the appendix, as an attack of appendicitis, if at least not a greater danger to the unintelligent, might result in peritoneal adhesions producing stasis, constipation and toxic absorption, which might act as a contributing cause of mental trouble, and the further recommendation might be made that at the time of the operation the Fallopian tubes should be severed and closed, thus preventing all possibility of pregnancy or subsequent infection by venereal disease or sepsis of the tubes, ovaries, pelvic peritoneum, etc.. However, sterilization of the mentally defective female, without interfering with her sex, should be a matter of legislation and the marriage of defectives, where the female has been so dealt with, should be encouraged.

It is probable that Australia within the next few years will receive a large number of immigrants and it appears to me that the medical examination of all immigrants should include a Wassermann test and a thorough investigation of the family history. It would be greatly in the interests of our young country if the British Medical Association took active steps to further such legislation.

Yours, etc.,

R. A. PARKER.

East Kew, Victoria,
May 6, 1922.

ROYAL AUSTRALIAN AIR FORCE MEDICAL SERVICE.

SIR: From the few words in the Education Number of THE MEDICAL JOURNAL OF AUSTRALIA concerning the medical service of the Royal Australian Air Force, the most earnest inquirer could gather very little information. Some of your readers may, however, be interested in the conditions of service of medical officers in the above Force or in the medical aspect of aviation, particularly as laid down in the "International Medical Requirements for Air Navigation."

Perhaps no other service offers a wider or more interesting field, either in the routine work or in the opportunities for research. The selection of a man suitable to become a pilot, simply to safely fly an aeroplane, involves much special work and is by no means easy. If he is to be a fighting pilot, the task is even more difficult. In addition to being medically fit in the ordinary sense of the word, the applicant must possess: (*i.*) capacity to stand high altitudes, (*ii.*) rapid reaction times, (*iii.*) sound vestibular sense and (*iv.*) good ocular muscle balance.

These and other qualities have to be thoroughly tested. In this connexion, special attention is invited to the regulations prescribed by the International Air Convention, Section 1 of which reads: "Every candidate, before obtaining a licence as a pilot, navigator or engineer of aircraft engaged in public transport, will present himself for examination by specially qualified medical men (Flight Surgeons), appointed by or acting under the authority of the contracting State." In order to perform his work well, the medical officer charged with the problem of determining fitness or otherwise, must have flying experience and, if possible, learn to control an aeroplane himself, so as to have complete, first-hand knowledge of what is required of a pilot.

I should be pleased to supply full details to anyone desirous of entering the Service.

Yours, etc.,

ARTHUR P. LAWRENCE, F.R.C.S.E.,
Senior Medical Officer, R.A.A.F..

Headquarters, Melbourne.
(Undated.)

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered under the provisions of *The Medical Act of 1867* as duly qualified medical practitioners:

BRESLIN, FRANCIS LOUIS, M.B., Ch.M., Univ. Sydney, 1922, Mater Misericordiæ Hospital, South Brisbane.

COOK, CYRIL EDMUND, M.B., B.S., Univ. Melbourne, 1922, Ipswich Hospital.

FORBES, LITTON ARTHUR ARMITAGE, M.B., B.S., Univ. Melbourne, 1922, Brisbane.

FRASER, KENNETH BARRON, M.B., Ch.M., Univ. Sydney, 1921, Brisbane Hospital.

Additional Registration:

LOWE, GORDON BRADLEY, F.R.C.S., Edin., 1921, Ingham.

Books Received.

AGRICULTURAL AND INDUSTRIAL BACTERIOLOGY, by R. E. Buchanan, Professor of Bacteriology in the Iowa State College of Agriculture and the Mechanic Arts, etc.; 1921. New York and London: D. Appleton & Company; Demy 8vo., pp. 468, with 67 illustrations. Price: 15s. net.

LES OCCLUSIONS AIGUËS ET SUBAIGUËS DE L'INTESTIN, par A. C. Guillaume; 1922. Paris: Masson et Cie; Post 8vo., pp. 304, with 21 figures. Price: Frs. 12 net.

PRACTICAL PSYCHO-ANALYSIS, by H. Somerville, B.Sc., F.C.S., L.R.C.P., M.R.C.S.; 1922. London: Baillière, Tindall & Cox; Demy 8vo., pp. 142. Price: 6s. net.

THE MECHANISM OF THE BRAIN AND THE FUNCTION OF THE FRONTAL LOBES, by Professor Leonardo Bianchi; authorized translation from the Italian by James H. MacDonald, M.B., Ch.B., F.R.F.P.S. (Glasg.), with a Foreword by C. Lloyd Morgan, LL.D., D.Sc., F.R.S.; 1922. Edinburgh: E. & S. Livingstone; Royal 8vo., pp. 348, with 49 diagrams and two figures. Price: 21s. net.

Medical Appointments.

DR. E. A. JOHNSON has been appointed Deputy Inspector-General of Hospitals, South Australia, during the absence on leave of DR. B. H. MORRIS (B.M.A.).

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii..

BEDFORD PARK SANATORIUM FOR CONSUMPTIVE SOLDIERS, SOUTH AUSTRALIA: Medical Officer.

BENEVOLENT SOCIETY OF NEW SOUTH WALES: Junior Resident Medical Officer of the Royal Hospital for Women, Paddington.

INTERNATIONAL HEALTH BOARD: Two Travelling Fellowships in Public Health.

ISISFORD DISTRICT HOSPITAL (CENTRAL QUEENSLAND): Medical Officer.

MELBOURNE HOSPITAL: Medical Officer, Assistant Medical Officer and Two Clinical Assistants for Venereal Diseases Department.

PUBLIC SERVICE COMMISSIONER'S DEPARTMENT, QUEENSLAND: Medical Officer for Venereal Clinics and Venereal Isolation Hospital, South Brisbane.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmain United Friendly Societies' Dispensary Friendly Societies Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phœnix Mutual Provident Society
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Manchester Unity Independent Order of Oddfellows Mutual National Provident Club National Provident Association
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Brisbane United Friendly Society Institute Hampden District Hospital, Kuridala, North Queensland Stannary Hills Hospital
SOUTH AUSTRALIA: Honorary Secretary, 3, North Terrace, Adelaide	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth	All Contract Practice Appointments in Western Australia
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	Friendly Society Lodges, Wellington, New Zealand

Diary for the Month.

JUNE 2.—Queensland Branch, B.M.A.: Branch.
JUNE 7.—Victorian Branch, B.M.A.: Branch.
JUNE 9.—New South Wales Branch, B.M.A.: Clinical Meeting.
JUNE 9.—Queensland Branch, B.M.A.: Council.
JUNE 9.—South Australian Branch, B.M.A.: Council.
JUNE 10.—Eastern District Medical Association, New South Wales.
JUNE 13.—New South Wales Branch, B.M.A.: Ethics Committee.
JUNE 14.—Western Australian Branch, B.M.A.: Council.
JUNE 14.—Melbourne Pædiatric Society.
JUNE 15.—Victorian Branch, B.M.A.: Council.
JUNE 16.—Eastern Suburbs Medical Association, New South Wales.
JUNE 20.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JUNE 21.—Western Australian Branch, B.M.A.: Branch.
JUNE 21.—South Sydney Medical Association, New South Wales.
JUNE 22.—Brisbane Hospital for Sick Children: Clinical Meeting.
JUNE 23.—Queensland Branch, B.M.A.: Council.

Editorial Notices.

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All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, B.M.A. Building, 30-34, Elizabeth Street, Sydney. (Telephone: B. 4635.)

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